American Railroad Journal.

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TRADES UNIONS AND STRIKES.

THE following portion of a chapter on the above subject is, with the consent of the publisher, reprinted from the last edition of "Fawcett's Manual of Political Economy."* It will be discovered by the reader that this chapter, like all the others in the book, is admirably clear, comprehensive and impartial, and, so far as those characteristics are concerned, it is in marked contrast to much that has recently been written and published on the "labor question."

The frequency of strikes has for a considerable period been a prominent feature in the social condition of England. The laboring classes would not always be ready to make such great sacrifices to support a strike, unless they believed it was an efficient remedy for low wages. The subject demands a careful and dispassionate consideration, for the prejudices of each party in the dispute are so strong, and the feelings excited so angry, that little is heard but useless recrimination and unreasoning partisanship.

According to popular ideas, strikes are inseparably connected with trades unions, and it will therefore be necessary, in the first place, to settle the much disputed question as to the purposes which trades unions are intended to fulfill. A royal commission, after an elaborate investigation, made a report in 1869 upon trades unions. From this report and other sources of information the following conclusions may be deduced: Trades unions serve two distinct purposes. In the first place a trades union performs the ordinary functions of a friendly society. A member of one of these societies is assisted, when thrown out of work either by illness or the stagnation of trade. It is not here necessary further to discuss the effects of a trades union, when it is simply used for the charitable purposes just indicated. But a trades union is always something more than a friendly society; its chief object is to organize the workmen of a particular trade into a combination, sufficiently powerful to enforce various regulations, both upon masters and men. The promoters of trades unions seem distinctly to understand that the most effective way to raise the wages in any particular trade, is to restrict the number of laborers who are employed in it. Consequently many of the rules of these societies are framed with the specific object of artificially limiting the supply of labor. Thus some trades unions will not permit a master workman to take more than a certain number of apprentices. In the hat trade the number is limited to two. If the union has sufficient power to enforce obedience to its mandates, any restriction which limits the number of those brought up to the trade must exert a direct influence to raise the wages which are paid in this particular branch of industry. For suppose that those who are engaged in the manufacture of hats were freely permitted to take as many apprentices as they pleased, the number of journeyman hatters in the country might be very much increased. Let it be assumed that there would be twenty per cent. more journeymen hatters than there are now; under these circumstances, there would be a greater number of laborers competing for employment in the hat trade, and their wages would consequently be reduced. The saving resulting from the lower wages will ultimately benefit those who purchase hats, because the price of hats would be reduced. The hat manufacturers would not be able to appropriate to themselves the savings which would accrue from the payment of a less amount in wages, because, when the cost of producing any commodity is reduced, its price is sure to be lowered in a corresponding degree, since people engaged in the same trade compete against each other for as large an amount of business as possible; and in their anxiety to undersell one another, they offer their commodities at a price just sufficiently in excess of the cost of production to leave them the profit ordinarily realized in trade. It therefore appears that those who purchase any commodity are compelled to pay a higher price for it, and that the wages of the laborers engaged in its manufacture are artificially raised when restrictions are imposed which limit the number of those who are permitted to be employed in the particular trade.

These restrictions can on no grounds be defended; in the first place, any such interference with the distribution of the labor of the country, amongst its various branches of industry, introduces many most mischievous inequalities. The labor of which some employments are compulsorily deprived is thrown, as a burdensome surplus, upon other branches of industry; and the wages in some employments are consequently as much depressed as the wages in others are raised. The members of a trades union, when they usurp such powers, virtually confiscate to their own advantage a portion of the wages which would be paid to other classes of laborers if industry were unshackled by such arbitrary rules. Although this injustice is striking, yet there still remains to be described a much greater wrong, which is inflicted upon those who are prevented by a trades union from following the employment they would select, if left to their own free choice. There is no right to which all men and women have a more indefeasible claim, than absolute freedom to follow those pursuits in which they think they are best qualified to succeed. The laws of a free country ought to secure to every one this right; for, if it is denied, individual freedom ceases to exist. Such a right is denied, if a person is excluded by a trades union from following a particular employment It is no excuse for the members of the union to say: Our trade is already

*"Manual of Political Economy," by the Rt. Hon. Henry Fawcett. Macmillan & Co.

overcrowded, wages are too low in it, and it would be disastrous if they should be still farther reduced by an increase in the number of those applying for employment. Every man has a right to judge of such things for himself; he may wish to engage in the trade because he has a particular capacity for it, and if he is arbitrarily driven to some other employment, he is deprived of the advantages of the skill with which nature has endowed him. It would therefore seem that trades unions may inflict upon laborers great social tyranny. It is not the laborers who alone suffer, for every class of the community is more or less injuriously affected. These trades unions may imperil the very existence of an industry in any particular district; for the various restrictions imposed upon employers may so much increase the cost of a commodity as to render it impossible for them to compete against others in the same trade, whose operations are not similarly impeded. Examples may be quoted which prove that some branches of industry have been driven from certain localities by trades unions. The societies have long been very powerful in Birmingham, and their efforts were at one time chiefly directed against the introduction of machinery. These efforts were in a great degree successful, and consequently when steam began to be generally applied, those trades which required much machinery settled in other localities, and the manufactures of Birmingham are to this day in a great degree confined to those branches of industry which require comparatively a much greater amount of manual labor than machinery.

It may perhaps be asked: How can these trade societies exercise the influence they do, when every one is aware that the coercion they practice is not based on any legal sanction? No one can doubt that the members of a trades union commit a criminal act, if they attempt, in the slightest degree, to interfere with any individual who does not belong to their society. It would therefore appear that social terrorism is the source of their power; for although such outrages as those committed at Sheffield are exceptional, yet a non-union man is subjected to so many petty annoyances that his life not unfrequently becomes a burden to him; and employers are coerced in a similar manner, if they do anything contrary to the rules of a trades union. Thus if a master, engaged in some business such as wool-stapling, where the trade is all powerful, were to employ non-society men, all his laborers who belonged to the trades union would at once refuse to work for him, and he would in this way be subject to great loss and inconvenience.

It is not, however, these regulations concerning the internal arrangements of a trade, which have caused so much public attention to be directed towards trades unions; the interest excited in these societies has been in a great degree due to their connection with strikes. The trades unions have, in fact, endeavored to regulate wages, and then apply their organization to compel employers to agree to their demands. If, for instance, it is proposed to reduce the wages in some particular branch of industry where the majority of the men employed belong to a trade society, then, if the leaders of the society consider that the reduction ought not to be made, they issue an order that work should be discontinued rather than accept the reduction. If the reduction is still insisted on by the employer, the immediate consequence is a turn-out of the workmen, or, in other words, a strike. Now it is evident that a trades union need not necessarily have the slightest connection with a strike; even if trades unions did not exist, strikes might be of frequent occurrence. A strike implies a combination amongst a large number of workmen, and such a combination is not possible unless a considerable majority of those engaged in any trade agree to act in unison. Such combined action as a strike requires cannot therefore exist unless the workmen submit to be governed by an organization. The trades unions supply this organization, without which there cannot be complete unity of action. It is quite possible, however, to conceive that a trades union may prevent a strike, and many of these societies have, as yet, never been connected with a strike; still, as long as a great number of workmen in this country are warm advocates of the system of strikes, it is quite certain that trades unions and strikes will be intimately connected together.

Since a strike requires combination, we have to inquire, when investigating the effect of strikes, whether workmen by combining can obtain higher wages. It can scarcely be disputed that they possess a perfect right to combine. The right may be, and has been, abused; then, of course, it ceases to be justifiable; but if employers are freely permitted to invest their capital to the greatest possible advantage, the employed may equally claim to be allowed to obtain the highest wages they can for their labor. If, therefore, any number choose to form themselves into a combination, and refuse to work for the wages which are offered to them, they are as perfectly justified in doing this as capitalists are when they refuse to embark their capital because the investment offered is not sufficiently remunerative. Workmen, however, do an illegal and most mischievous act, which ought to be severely punished, if they attempt to sustain the combination by force, or if they coerce individuals to join it by threatening to subject those who keep aloof either to annoyance or personal violence. Workmen have sometimes maintained their combinations, not only by acts of violence, but also by various kinds of social terrorism. Justice obviously demands that the blame which attaches to such actions should not be borne by those who never abuse the power of combination. An increasing number of the intelligent artisans of this country each year become more decided advocates of trades unions. The influence of these societies is rapidly extending in other countries; it is therefore very important to ascertain the effect exerted upon wages and upon the general condition of the laborer by a legitimate use of the power of combination.

It is interesting to remark, as pointed out in "The Economics of Industry" (p. 189), by Mr. and Mrs. Marshall, that when trades unions first began to be formed at the beginning of this century, they directed their efforts mainly to obtaining the revival of certain restrictions in trade, such as a limitation in the number of apprentices, which had been framed in the time of Mary and Elizabeth. Gradually, however, instead of asking for Government interference, trades unionists have so successfully directed their efforts to free themselves from Government interference, that now the right of combination has been fully recognized and workmen are freely permitted to combine in any manner which would be lawful to other persons.

When investigating the effect of trades unions on wages it is essential to keep clearly in view the fundamental distinction between the permanent and temporary consequences which arise from the operation of an economic agency. In every branch of industry there is a certain position of equilibrium to which profits and wages have a tendency to approximate. A long time, however, may be required to restore wages and profits to this position of equilibrium. Thus the woolen trade cannot permanently continue very much more profitable than the cotton trade, because the competition of capital will gradually induce capital to be invested in the one trade and withdrawn from the other. Competition cannot exercise this equalizing force instantaneously; it takes, for instance, a considerable time to erect new woolen mills, and there will always be much hesitation before men will relinquish such a business as the cotton trade, to which they have been accustomed. Hence, one branch of manufacture may continue for many years exceptionally prosperous, whilst in some other business there may be a corresponding depression.

Competition exerts a similar equalizing influence upon wages. If wages in one branch of industry are exceptionally high, whilst in some other they are exceptionally low, labor will be gradually attracted to the business in which the high remuneration is given, and will be withdrawn from the business in which the remuneration is less than the average. But here again time is required for carrying out this equalizing process. Laborers will rather submit to some temporary loss than change their occupation. A considerable expense will also be incurred, if a man has to change his residence in order to obtain a new employment. In some cases it happens that such obstacles as these neutralize the force of competition, not temporarily, but for an indefinitely long period. For instance, the wages of agricultural laborers in some localities are permanently depressed below the average rate. The reason of this is, that the force which competition would exert to advance these wages is neutralized by the laborer being prevented through ignorance and poverty from resorting to those localities where wages are higher. These general remarks enable us more exactly to determine the influence which can be exerted upon the condition of the laborers by the power of combination.

If competition acted simultaneously, or in other words, if profits and wages in every branch of industry were always at their natural rate, it might be at once concluded that the power of combination could exercise no effect either upon profits or wages. Suppose, for instance, that workmen by resorting to a strike obtained an advance in wages. This advance would be of no benefit to them, if the competition of other laborers, anxious to participate in this advance, could immediately produce its equalizing effect. No conclusion of any practical value can be arrived at on the subject unless the mode in which competition acts is kept steadily in mind. In all those branches of industry in which the competition of labor and capital freely acts there cannot be secured any permanent increase in profits or wages, by a combination either of employers or employed. It has, however, been previously remarked that in some cases the equalizing effect of competition is neutralized through an indefinitely long period. This occurs with regard to agriculture in those counties where the wages are the lowest. When a branch of industry is in this position, there can be no doubt that laborers can, by combining, secure a permanent advance in wages. Suppose, for instance, that when the Dorsetshire laborers were earning only ten shillings a week they received so much extraneous assistance that they were able to maintain a prolonged strike. The farmers, under such circumstances, would almost inevitably be vanquished in the struggle. They would be ruined if their land remained uncultivated, and since the wages previously paid were minimum wages, it would be impossible to obtain labor from other localities unless a higher remuneration were offered for it. The power of combination has, within the last few years, since the establishment of agricultural laborers' unions, produced some effect in raising the wages of our worst paid agricultural laborers. When these combinations become more general, various other agencies, such as migration and emigration, will be brought into operation to raise wages. It now remains to investigate the influence which a power of combination may exercise upon wages and profits, during the time which always elapses before competition can produce its equalizing effect.

When men labor simply for hire, it is manifest that the adjustment of wages is analogous to the bargaining which is carried on by the buyer and seller of a commodity. Although it is no doubt true that the price at which a commodity is sold, approximates to the cost at which it can be produced and brought to market, yet the price at which it is actually sold is often to a considerable extent influenced by various circumstances which may happen to place the buyer in either a better or worse position for bargaining than the seller. In a similar way wages ultimately depend upon the amount of capital and upon the number of laborers; yet the wages which, at any time, are paid in a certain trade are to a considerable extent influenced by the relative advantages possessed by employers and employed for carrying on the bargaining by which wages are adjusted. The question therefore arises, will workmen by combining, or by showing that they have the power to combine, improve their position in carrying on this bargain?

(*To be continued.*)

REPORT OF THE NEW YORK RAILROAD COMMISSIONERS ON THEIR CAR-COUPLER TESTS.

THE board of railroad commissioners have made public their decision and recommendation upon their car-coupling tests recently made. They issue this statement:

The authorities of the New York Central and Hudson River Railroad Company courteously put at the disposal of the board every facility to make the trials as complete as practicable under the circumstances. The tests were made upon the curve of a side-track and under such conditions as would most frequently occur in practical operation. Thirty-three different couplers were represented. The points and requirements particularly considered were as follows:

First.—Facility to couple with its own kind with same or different height of draw-bar.

Second.—Facility to uncouple under all circumstances.

Third.—Facility to couple with common link-and-pin, and whether automatic or not.

Fourth.—Certainty to hold on uneven track.

Fifth.—Capacity to set so as not to couple when "kicked" into side-tracks, etc.

Sixth.—Non-liability of obstruction by dirt, snow, ice, rust, etc.

Seventh.—Strength to resist concussion.

Eighth.—Certainty of knowing which car to uncouple in the dark.

Ninth.—Position of device to raise pin so as not to be above floor of car, with reference to applicability to platform cars.

Tenth.—Non-interference of uncoupling device with brakeman guiding link into old draw-bar.

Eleventh.—Simplicity of construction.

Twelfth.—Cost.

The importance of the subject is shown by the fact that the average number of deaths from coupling per year in this State for the last two years has been sixteen deaths and 380 injuries to person.

The board had three principal objects in making the tests:

First.—To give an opportunity to inventors to display their devices in a public way.

Second.—To see what devices presented fulfilled the requirements of the law.

Third.—To take another step toward determining, if possible, which is the best coupler.

The first two objects were attained. Some, but not much advance was made toward the third. There are so many devices having merit, yet none without objection, that the board would be greatly embarrassed were it required to positively recommend any one to the exclusion of all others. This may seem a somewhat disappointing conclusion, but it is the only one possible under the circumstances. If the merits of all could be combined in one, a perfect coupler would be the result, but it must be remembered that every little improvement is patented, and, until sufficient essential patents are the property of one party, a perfect device seems impossible. In the analogous case of the Westinghouse air-brake a vast number of patents have been purchased by the Westinghouse company in addition to the original invention of Westinghouse, and so with almost every other device which is in final successful operation.

The board proposes to give this subject its continued attention. The impressions and views it now holds it gives with due caution, reserving the right to alter or amend them as circumstances and increased investigation and experience may warrant.

To attain the main object of an automatic coupler, *i. e.*, to save the limbs and lives of trainmen, it is most desirable that but one device should be in universal use. If there is diversity it will increase rather than diminish the present dangers.

There appear to be but two ways for this to be brought about, one by the operation of the law of the "survival of the fittest," the other by the creation by congress of a commission to determine upon one coupler and compel its adoption by all companies engaged in inter-State commerce.

The first method, it would seem, will be slow beyond all computation from present indications. There appears to be no good reason, however, why the second could not be done.

Under its powers to "regulate commerce among the several States," congress has already prescribed rules for the inspection of hulls and boilers of steamships, for the examination of engineers as to their competency, for vessels being provided with boats, life-preservers, and for many similar things to insure the safety of travel by water.

It would seem that the same power could and should be exercised to insure safety in the operation of railroads.

From the diversity of the recommendations made by the States which have already acted on the coupler question, it seems to be hopeless to secure unanimity from them acting separately.

One is embarrassed at the outset of this subject with the fact that there are two rival and irreconcilable classes to deal with—first, the so-called "vertical plane couplers," and second, the link couplers.

VERTICAL PLANE COUPLERS.

Some of the practical difficulties with the vertical plane class are:

First.—None of them, as at present manufactured, with the exception of the Cowell and Janney, couple automatically with any other.

This difficulty could be remedied to a great extent by having the movable knuckle universally on the right side, and of the same size. But positive objections are made by the Hein company, for instance, to altering the proportions of the coupler, on the ground of destroying its strength.

Second.—None of them undertake to couple automatically with the old link-and-pin, except the Cowell.

This is a most serious objection, for the reason that the slot into which the link goes is much smaller than in the old draw-head, and the danger to the brakeman of getting his hands caught correspondingly greater.

The cars with which many of them are equipped are not provided with deadwoods, so there is no protection for the trainmen in case of the draw-heads being broken by concussion. Deadwood blocks should be provided in all cases.

The device to couple and uncouple is frequently in the way and adds another danger.

In the case of the Cowell a throat is cut in the face to take a link. There is a dog moved by a spring to hold the pin up. This dog is intended to be pushed back by the link and the pin to fall automatically. The difficulty is twofold.

First.—The link would only be pushed in by a draw-head having a solid throat. (This difficulty is common to a great many.)

Second.—The throat in the Cowell is so shallow that the link strikes before the draw-heads come in contact, so the link would take the whole force of the blow in coupling, and would bear the whole strain pushing—conditions which would bend or break it.

Third.—Almost all of the vertical plane couplers appear to be more or less liable to become fouled by dirt or rust if left standing for some time exposed to the weather, al-

though there is quite a difference in them in this respect; the contrivance to catch the arm and hold it in place being quite complicated in some and simpler in others.

LINK COUPLERS.

Link couplers as a class present certain obvious advantages. They are simple in construction, cheap, not so liable to get out of order, conform better to the present method of coupling, and afford more "slack," thus allowing a long freight train to be more easily started than if coupled with the closer "vertical plane" type. The board does not propose to discuss the question as to which class forms "mechanically" the more perfect union. It is sufficient to say that either forms a sufficiently perfect union. The advantage which many of the link class possess of coupling automatically with the old draw-head the board deems of great importance. It will be many years before the latter is entirely discarded from the railroads of the country, and, therefore, forms an important factor in the problem.

A serious difficulty, however, with this type is that none of them will couple automatically with the old draw-head unless the latter has a closed throat, so that the link will be pushed on to the hook or against the dog to allow the pin to drop, as the case may be.

All those familiar with the subject will recognize that this requires a link of a standard length, and a throat both in the old draw-head and in the automatic draw-head of a standard depth, shallow enough to insure the link being pushed so as to secure connection, and deep enough to permit the draw-heads to come in contact after connection.

Inasmuch as a very large proportion of the old draw-heads are either "skeleton" or hollow too far back, this requirement makes an automatic coupling with them impossible.

It is desirable that a standard link be adopted and that all draw-heads be provided with a stop in the throat so as to permit the link to enter but half an inch beyond its middle point. This could be done at a trifling expense.

It is quite obvious, therefore, that any automatic coupler requiring a link longer than the standard (say ten-and-a-half inches inside measurement) is essentially defective. This is equally true with regard to any fixed link coupler.

It is also asserted that any hooked coupler (such as Archer, etc.), is apt to have hook wear away, thus rendering uncoupling liable—this fact gives an advantage to a pin.

The law of the State as it exists to-day is very broad. It provides that no coupler shall be placed upon any new freight-car * * * "unless the same can be coupled and uncoupled automatically without the necessity of having a person guide the link, lift the pin by hand, or go between the ends of the cars."

Such coupler might be defective, however, in many of the respects heretofore pointed out. The strict legal duty of the board would be fulfilled in seeing that the railroad corporations adopt such devices as come within the law, however defective in other respects; and, indeed, it is the only positive power vested in the board in the premises. It has deemed it better, however, to call attention to the matters hereinbefore mentioned and to make the following recommendations:

CONCLUSIONS AND RECOMMENDATIONS.

The board of railroad commissioners recommends:

First.—That the standard height of draw-bar of the Master Car-Builders' Association, viz.: two feet nine inches from top of rail to center of draw-head when car is empty, be adopted by all railroad corporations; that new cars be made to conform thereto, and that old cars when repaired be made to conform as nearly as possible.

Second.—That all freight-cars not having platforms, be equipped with "deadwood" blocks to conform to the standard of the Master Car-Builders' Association.

Third.—That a standard link be adopted of ten and one-half inches inside measurement, and thirteen inches outside measurement.

Fourth.—That all existing link-and-pin draw-heads be provided with a stop in the throat to prevent a link entering more than seven inches.

Fifth.—Of the couplers presented to be tested on the 16th and 17th of June, the board finds the following to fulfill the requirements of the law.

There are many others of which the board has drawings or models and which possess merit, but as to them the board makes no mention, for the reasons, first, that cars were not equipped with them, and, second, that but little weight can be given to the working of a model alone.

Those practically tested are divided:

First.—Into classes mentioned in what the board regards as the order of merit.

Second.—Each coupler is mentioned under its class in what the board regards as its order of merit.

FIRST CLASS.

A.—Link and pin couplers; pin held up by catch or "dog." The "dog" is thrown back by link entering, allowing pin to drop automatically—uses standard link and couples automatically with old draw-bar if stop in throat, or,

B.—Beveled pin permitting link to slip under:

Hoag, McKeen, N. Barr, Perry, United States, Robinson, Keeler, Sherman, Thurber, Whitman Kilmer (beveled pin), Wilson (beveled pin).

SECOND CLASS.

Vertical hook and link. Link pushed on to hook. Couples automatically with old draw-bar if stop in throat: Archer, Aikman, Marks, Smillie, Baldwin, Fennell.

THIRD CLASS.

So-called "vertical plane couplers." A "knuckle" opening in a horizontal plane, fits into a corresponding knuckle on other draw-bar—does not couple automatically with old draw-head, except Cowell, which has throat in face:

Janney, Barnes, Cowell, Thurmond, Dowling, Hein, Titus & Bossinger, Boston Automatic, Lorraine.

FOURTH CLASS.

Fixed link. Does not couple automatically with old draw-bar:

Ames, Curtis & Wood, Adams, Felthausen & Lawtenslager.

MISCELLANEOUS.

Powell: Has a toothed wheel to serve for pin. Ingeni-

ous but practicability not been demonstrated. Couples automatically with old draw-bar:

Wood & Drake, doubtful utility. Kaltenbeck, doubtful utility.

REPORT OF COMMITTEE OF THE MASTER CAR-BUILDERS' ASSOCIATION ON STANDARD DEAD-BLOCKS.

AFTER giving a history of the action of this association with reference to standard dead-blocks and the height of draw-bars for freight-cars, the committee on this subject concluded its report to the last convention as follows:

Your committee are quite well aware of the disfavor with which any change of standards already adopted by the association is regarded—and properly so—by a majority of its members. Nevertheless, if there is good reason for making such a change, the sooner it is done the better. In the case of the standard dead-blocks, it will be seen that the height from the tops of the rails to the under side of the sill is 3 feet. This would make the height to the center of the dead-block 40 inches. The height of draw-bars and dead-blocks of twenty-four of the principal railroads is given in the following list:

NUMBER OF CARS OWNED BY, AND STANDARD HEIGHT OF DRAW-BARS AND DEAD-BLOCKS ON DIFFERENT ROADS.

	Number of Cars owned.	Height from top of Rails to center of Draw-bar.	Height from top of Rails to center of Dead-block.
		Inches.	Inches.
New York Central & Hudson River	31,117	33⅝	44
New York, West Shore & Buffalo	7,721	33	42
Pennsylvania	47,013	35	42¾
New York, Lake Erie & Western	31,000	34	42¾
Lehigh Valley	24,247	35¾	....
Delaware & Hudson Canal Co	11,392	33½	43¾
Buffalo, New York & Philadelphia	5,680	34	43¾
Delaware, Lackawanna & Western	24,000	32½	....
Chicago, Burlington & Quincy	17,940	33	40¾
Chicago, Rock Island & Pacific	8,081	33	40
Chicago & Northwestern	21,000	33	41⅛
Illinois Central	9,075	33	41½
Grand Trunk	10,375	33	41
Intercolonial	4,745	33	40½
Missouri Pacific	18,050	33½	42
Central Vermont	3,256	33	40¾
Burlington, Cedar Rapids & Northern	4,307	35	42
Mobile & Ohio	1,553	34½	41½
Louisville, New Albany & Chicago	2,286	35	43½
Chicago, Milwaukee & St. Paul	20,498	33½	41¼
Detroit, Lansing & Northern	2,681	33	39¾
Chesapeake & Ohio	5,953	35	43½
Baltimore & Ohio	21,912	35	44½
Chicago & Alton	6,666	35	43½

From this it will be seen that on only two of the roads are the dead-blocks placed as low as the standard height. All the other roads place them higher. This is tolerably good evidence that the standard height is too low.

By comparing the height of draw-bars, in actual use on the different roads named, it will be seen that a majority—14 of them—are over 33 inches high. If we count the cars owned by those roads, we find that those lines which place the draw-bars higher than the Master Car-Builders' standard, own 231,674 cars, whereas those which have adopted 33 inches or under, own only 108,874. It is fourteen years since the standard height of 33 inches was recommended by the Car-Builders' Association, and yet it has not secured a more general adoption than the figures which have been quoted indicate. All of the members of the Car-Builders' Association will agree that it is very desirable to secure uniformity in the height of draw-bars. The question then comes up, with the prevailing practice which has been described, what is the best method to adopt to secure uniformity? Is it to adhere to the standard which was adopted fourteen years ago, or would the end aimed at be best secured by a modification of it to suit the existing practice of the principal lines?

Doubtless, if the standard was to be established to-day it would be made higher than it was in 1872. As already stated, in 1884, when the standards were revised by the executive committee, they recommended that the height of draw-bars should be 2 feet 9 inches "when the car *is loaded to its full carrying capacity.*" The association overruled the recommendation of the committee, and made 33 inches the height when the car is *empty.* The discussion of this subject, however, revealed that many of the members misunderstood that the standard height was to be measured when the car is *loaded.* In recommending a standard for dead-blocks the committee at the outset have encountered the difficulty that the present height of draw-bars is *too low*, and as it determines, to some extent, the height of the dead-blocks, the committee were compelled to consider the one standard as well as the other. The question which they felt obliged too entertain was that which has already been stated, that is, what action of the association will be most certain to bring about uniformity in the height and dimensions of draw-bars and dead-blocks? On careful investigation your committee were compelled to conclude that some modification in the standard height of draw-bars and dead-blocks is essential to secure their general adoption.

They therefore recommend:

First.—That the standard height of draw-bars for freight-cars, measured perpendicularly from the tops of the rails to the center of the draw-bar, shall not exceed 2 ft. 11 in. when the car is empty, nor be less then 2 ft. 9 in. when it is loaded.

Second.—That the height of dead-blocks, measured from the tops of the rails to the center of the blocks, be not less than 3 ft. 5 in. when the car is loaded, nor more than 3 ft. 9 in. when it is empty.

Third.—That when double dead-blocks are used that their vertical height and their width, measured crosswise to the track, be each 8 in., and their thickness, measured lengthwise to the track, be 6 in.; that they each consist of a casting as represented by the drawing submitted with this report.

Fourth.—That when a beam, attached to the end-sill, is used for carrying the dead-blocks, that it be made 36 in. long, not less than 4 in. thick and 8 in. vertical depth.

Fifth.—That in other respects, double and single dead-blocks be made in conformity to the standards heretofore adopted by this association, as shown in the drawings submitted with this report.

Sixth.—The committee also recommend that the nuts on the ends of the truss-rods be seated in cup washers, so as not to project beyond the surface of the end-sill, and that the space between the ends of the cars be kept as clear as possible of bolt-heads or other objects which are liable to catch the clothing or injure those engaged in coupling cars.

Further, the committee recommend the adoption of the following resolution:

Resolved, That the recommendations of the committee on Dead-blocks be submitted to the members of the association for approval by letter-ballot.

CHARLES BLAGKWELL.
GEO. W. DEMAREST.
M. N. FORNEY.

Legislation on Patent Laws.

ON January 26, the Hon. R. W. Townsend, of Illinois, introduced a bill in the House of Representatives, and which has been reported favorably by the Committee on Patents, under the title of "An Act to limit the jurisdiction of United States Courts in Patent Cases, and to protect persons who, without notice, are bona-fide manufacturers, purchasers, venders, and users of articles, machines, machinery and other things for the exclusive use, manufacture, or sale of which a patent has been or may hereafter be granted."

The bill provides:

First.—That United States District and Circuit Courts shall have no jurisdiction to hear or try any case wherein the amount in controversy does not exceed two hundred dollars.

Second.—That purchasers of patent rights for actual use shall not be liable for infringing the same to joint, part owners, or others, of whose ownership or interest they had no knowledge at the time of the purchase, and further,

That no purchaser of any article, machine, etc., who at the time of such purchase was unaware that the same was covered by patent or patents, shall be liable for damages for infringement, until after written notice by the patentee.

Third.—Repealing all law or parts of laws inconsistent with sections 1 and 2.

Fourth.—That suits now pending shall not be affected by the act.

Commenting on this, in a letter to one of the daily papers, Mr. Geo. H. Benjamin of New York says: "The practical effect of this bill will be to utterly destroy a patent system which it has taken a hundred years to build up, and which is being gradually adopted as the best in use, by all the great nations of the world.

"Western legislators seem to have a peculiar spite against patents in general, and lose no opportunity to attempt legislation inimical thereto—forgetting that in a great measure the material prosperity of this country has been due to our liberal patent system and the protection accorded to inventors.

"It will be observed that this bill provides for taking away the right of action, and hence the remedy by injunction, unless the amount in controversy be $200. In the large majority of cases before the courts, it is quite impossible to tell what the damage has been until after the accounting before the master, and further, the question is often not so much the recovery of damages as of restraining further injury; and for this very reason, suits are usually brought on the equity side of the United States Courts. The right of appeal to the Supreme Court of the United States is not limited by the amount in controversy, and it seems rather absurd to create such a limitation in the subordinate courts. In short, this section is not only probably unconstitutional, but in direct opposition to many of the statutes relating to the jurisdiction of the United States Courts, and to patent interests, which would in effect be repealed by the third section of the proposed bill, and hence entail hopeless confusion.

"Relative to the second section of the bill, it establishes a premium upon ignorance and mendacity. In effect it licenses and encourages infringement. A knowledge of the law is always to be presumed, and whether one violates it innocently or with malice he should suffer the prescribed penalty. The 'innocent purchaser' humbug has been made the excuse for all sorts of attempts at vicious legislation. If a man buy a piece of property he will search the title. Why should he not do the same in the matter of a patent right? The Government provides a record, and such search can be readily made and at small cost. There is already a law specially applicable to registry of title of patent rights.

"Again, the bill provides that the innocent purchaser shall not be liable until notified.

"A finds an empty house, takes possession and occupies it, in the absence of the rightful tenant. He claims that he is not liable for trespass, because he did not know it belonged to any one. It is unnecessary to say such an excuse would be of little avail.

"What arguments the advocates of the bill have advanced, I am at a loss to conjecture. There is no doubt, however, that the passage of such a bill would be a severe blow to all the patent interests of the country, and it should not be permitted to become a law."

Odd Results of Railroad Building.

THE two railroads that are engaged in the construction of the spur from the West Shore Depot to Bergen Point, and of the spurs from the several railroad depots in Jersey City to the point at the foot of Hudson City hill, at which the Great Union Depot is to be situated, are having a phenomenal experience with their work. The Pennsylvania Railroad Company is building a high embankment across the streets at the foot of the hill, and then around the east side of the hill. The Junction Railroad Company, in which all the roads, including the West Shore, are said to be interested, is preparing to build a piled trestle at an angle of about 45° with the Pennsylvania Railroad's embankment. The Pennsylvania Railroad system of construction is to erect a simple trestle, and then fill in around it. The trestle and filling are being put on made ground, and it is not an unusual thing for the laborers, on going to work in the morning, to find the trestle and filling twenty feet below the level at which they had been left the night before. One night the trestle sank twenty-eight feet. The city at that point rests on a crust above a marsh of unknown depth, and the filling-in done by the road sinks below the earthy crust into the marsh, and, spreading, affects the level of the land many feet distant from it.

At Second street, between Pryor and Merseles streets, there stood eighteen houses. They had been purchased by the Junction Railroad, which is to cross at that point,

with the design of removing them to First and Third streets. It was discovered, however, that the filling at the Pennsylvania embankment a block away, sank into the marsh, spread under their foundations, and lifted them in some cases twelve to fifteen feet above their usual level. They were in such danger of falling that their immediate removal became necessary, and all but two have been taken away. At the corner of Third and Merseles streets are six houses, owned three each by ex-Sheriff Cronan and State Treasurer Toffey, that have been raised high in the air by the swelling of the ground on which they stand. They have been shored and blocked up, and it is proposed to let them stay there if possible.

The houses thus affected by the filling-in are at least 150 feet away from the embankment. Second and Third streets at the place indicated are new streets, having just been graded. The phenomenon is not so noticeable at the older thoroughfare of First street, though it is very much nearer to the company's filling than Second and Third are. The houses that face on First street have not been affected, though the swelling of the land approaches so closely to them that their rear yards have been raised into terraces.—*New York Evening Post.*

Proposed Tunnel Across Northumberland Straits.

WHEN Prince Edward's Island, Gulf of St. Lawrence, entered the confederation of the Canadian Dominion, one of the articles of agreement was that communication should be maintained with the mainland of Canada all the year round. In consequence, large sums of money have been thrown away on the *Northern Light* and other steamers, which, it was expected, could force their way during winter through the fields of Arctic ice which block Northumberland Straits. The result has been a complete failure, and the 125,000 islanders, notwithstanding the agreement, are practically shut off from communication with the outer world in the icy months of winter. It is now proposed to keep up communication all the year round by constructing a tunnel tube resting on the bed of the straits. The plans, which have been accepted by the government of the island, have been under the consideration of a committee of engineers, submitted to the Dominion Government, and the scheme is to be brought before the Canadian Parliament in the current session. Four lines have been surveyed across the straits, and a plain or plateau has been found in which the tunnel tube can be successfully laid.

It is proposed to build on each side of the straits piers inside of the "bordice," through which the tube is to be driven for some 2,800 feet, the total length of the huge pipe or tunnel being six and a half miles, or about five and a half nautical miles between the piers. The bottom of the straits shows a very good road bed, the depth of water varying from 36 feet on the island side to about 80 feet in the middle of the straits, and thence ashore on the New Brunswick side, 10½ feet. The tunnel is to be 18½ feet in diameter, and to be constructed of heavy sections of chilled white cast-iron, 4 inches thick or more, according to depth. Mr. H. H. Hall, of the Submarine Tunnel and Tube Company, of New York, is the patentee of the process of casting the tubes, as well as of the chilled white metal used. It is estimated that at the present market price, the cost of the iron for the tunnel would be £17 per linear foot, making the total estimated cost of the work close upon £1,000,000. The metal is stated to be non-corrosive in sea water, as shown by the exposure for 12 years in the harbor of Sidney. The sections are bolted together by inside flanges, making a water-tight rust joint with a smooth exterior. A connection with the surface could be maintained by a vertical shaft if desired; but, as a railway could be laid through the tunnel as fast as it is built, all the material used could enter that way, a supply of fresh air be obtained, and communication maintained with the shore. Where the depth of water will allow of the obstruction to the channel, the tunnel is to be laid on the natural bottom of the straits; otherwise a channel is to be dredged, in which the tube is to be sunk.

Chinese Railway Scheme.

ON the subject of the recent unsuccessful endeavors of certain German capitalists and iron manufacturers to secure from the Chinese Government a contract for the construction of railways, the *Vossische Zeitung* says:

"A conference, in which representatives of the Deutsche Bank and the iron industry took part, has been held at the Discount Bank, and reports were presented from the delegates in China. From these it appears that a decision on the part of the Chinese Government as to the construction of the railways is not to be counted on with certainty until the Emperor attains his majority—that is, at the end of next year. The reports show, moreover, that the circumstances of the country are not at present of a character to justify the expectation, indulged in on many sides, that railways would be profitable. Besides this, English competition must be carefully borne in mind.

"In face of these reports, it was resolved to recall Herr Erich at once. Another of the three delegates will return in a short time, while the third will remain in China for the present."

The answer received by the deputation from the Viceroy at Tientsin is said to have been: "We will build railways when we are able to manufacture the material in our own country." The reports candidly admit that the result of the mission to China is absolutely *nil.*

To such a frank statement nothing need be added. The gigantic railway scheme, of which so much has been said and written, proves to be a mere myth.—*London Times.*

How Coal Has Been Displaced by Natural Gas.

THE use of natural gas in the manufactories of Pittsburgh has done away with the consumption of 189,850 bushels of coal a day. In 250 working days, which is considered a year by manufacturers, the whole amount of coal displaced would run up to 47,450,000 bushels. Calculating 100 bushels to be an average day's output for a coal miner, it would take 1,600 coal miners to dig this coal, but altogether the use of natural gas has thrown about 5,000 men out of work in this region. It required the use of 633 railway cars to transport the coal. Each of these 30 feet in length, would make a string more than three miles long.

British versus American Locomotives.

A LIVELY discussion of the relative merits of British and American locomotives has been carried on in the columns of the English engineering papers. A correspondent, Mr. John Fernie, who seems to be a British subject, now resident in Pennsylvania, in a recent letter to *Engineering*, sets forth some of the advantages of American locomotives in the following forcible language: "The English straight axle, whether of iron or steel, requires a great deal of special hammer work put upon it. The central portion has to be reduced below the collars and bosses for the wheels; it has to be heated and reheated for this purpose, and there is considerable loss and waste in the furnace, and through cutting and paring cross-ends; and however carefully forged, there is a good deal of waste in the lathe, cutting out for the journals and collars. Now, the American axle is cut from a straight bar forged or rolled.

"There is little waste in cutting it to length, and putting it through a straightening mill; there is only a slight scraping taken off it in the lathe to true it up for the wheels, journals and collars, the latter being shrunk on instead of being solid as in the English axle. In the case of the driving axle the center part is turned a little larger than the portion for the wheels and journals. The eccentrics solid are first pushed on, then the collars are shrunk on, and then the wheels, the end contact of the axle-brasses being made between the bosses of the wheels and the collars.

"Now, as compared with the English axle, we have here:

"1. No distortion of fiber or irregularity of structure arising from the forging.

"2. No sharp corners to weaken or start a fracture when a heavy blow or strain is thrown on the wheels.

"3. Most perfect simplicity and economy; and this simplicity and economy is carried throughout every detail of the American engine. Some of your correspondents have said that any country blacksmith could repair it, and surely this is the very highest recommendation. Scattered over some 130,000 miles of railroads of this great continent, climbing huge mountains, running over the most miserable roads—many without ballast—crawling over rickety wooden bridges, or turning square round a street corner on the overhead railroads in New-York, there is no other engine that could adapt itself to this work; often ditched by washouts in wild, unsettled districts, there is no engine which can be so quickly set on its legs again. Can we wonder our colonists desire it? A machine on which there is not a pound's weight of material more than is required, not a cent's worth more cost than is necessary; there is no other engine which has such steaming qualities, or can take such heavy loads, and this engine is a racer, too, as Mr. Burnett describes it; coming thundering along at more than seventy miles an hour with the brave boys strapped on, coolly taking their diagrams. We hold our breath, and say on what English engine would you like to do this, when, most astonishing, Mr. Burnett trots out a Brighton engine, and with his pencil and paper and a few figures runs the American engine off the road.

"In my former letter I asked, what would American engineers gain by using the plate frames? Let me ask what American railroad companies would lose by using the English crank-axle and the English wheel? Taking the last year's returns of what I consider the model railroad of the world, the Pennsylvania Railroad would, according to their mileage, had they used the English locomotive, have broken from 170 to 200 crank-axles last year. That is, at 200,000 miles per crank. Figure up the forges, steam-hammers, slotting machines, and crank-axle lathes required to turn out all their crank-axles. This same railway last year turned out of their foundry upwards of 100,000 cast-iron wheels, and they saved nearly £60,000 sterling by making them at their own works. Count up the regiment of forges, lathes and slotting machines to turn out 100,000 English wheels in a year, and when to all this you add the copper fireboxes and brass tubes required by the English engine, you will get an idea of not only the loss, but what would be the ruin of the American railways, the adoption of the English locomotive engine.

"I was quite willing to accept Mr. Burnett's estimate that the American engine was £400 cheaper than the English engine, but since he explains away that estimate I must place the different details of the engines opposite to one another, and leave engineers to judge for themselves as to their relative expense, my estimate being that the American engine, say with 16 in. cylinders, would cost less than what I mentioned in my former letter.

English Engine.	*American Engine.*
Boiler, best Yorkshire iron.	Open-hearth steel.
Copper firebox ½ in. thick.	Steel firebox $\frac{5}{16}$ in. thick.
Copper stays.	" stays.
Brass tubes.	Iron tubes.
Crank-axle.	Straight-bar axle.
Straight axles forged.	" " axles.
Plate frames.	Bar frames.
Steel horn blocks.	
Wrought-iron wheel centers drivers.	Cast-iron centers.
Crucible steel tyres.	Open-hearth steel tyres for drivers.
Wrought-iron centres leading.	Cast-iron wheels.
Crucible steel tyres.	Leaders in bogie.

"I conclude this portion of my letter by saying that, in my opinion, no more complicated, wasteful and unscientific form of locomotive engine could be devised than the English engine, and no more simple, economical and scientific than the American engine, and my advice to the English railway companies would be to copy it and to duplicate it as soon as possible.

"Now for results. Well, take our greatest colony, the one nearest our doors, the most loyal, a country of boundless undeveloped wealth, the colony with the greatest railway mileage, and whose very existence and future development depends on the extension of railways and cheap ways of working them, a country where railways have been built with English capital. Does Canada use the English locomotive or the English wheel? and if not, then why not? Surely the example of Canada, Australia, and New Zealand refusing to use the English engines should be enough.

"There is no doubt that in the old times many an English victory was obtained by men not knowing when they were beaten, but brute strength will not win the battle in

these days of science and precision. We must excel the victor in his arts, or copy him. Has England the inventive skill to beat America? What improvements has England effected during the last twenty-five years in railways, and what has America done? Will England copy American inventions and ideas? Certainly not till she is compelled. Look at the first street-railway in London; at Mr. Alport's attempt to introduce the American carriages on the Midland Railway. Take the last case, perhaps one of the very worst, the automatic brake. Now, in my opinion, there was only one good brake in the market, and this was so much the best that there was not even a good second to it; but if reasonable terms could not have been made for its use, then all the companies should have united and adopted the next best. What is the case today? How many brakes are there in England? In America there is practically but one brake, and uniformity is universal, but how can there be interchangeability when there is diversity of apparatus and systems as in England? Consequence is, the railways have to pay for it, and when the system is adopted on goods trains as it is being done here, it will cost the railways perhaps a million to get the best brake, the one that should have been adopted at the first. Yours faithfully,

"JOHN FERNIE, M. I. C. E., England.
"DUNDAFF, PA., U. S. A., June 14, 1886."

Oliver Evans and His Inventions.

IN a lecture on this subject delivered at the Franklin Institute in Philadelphia, Nov. 20, 1885, by Coleman Sellers, Jr., he sums up the work of Evans in the following concluding remarks:

With regard to Oliver Evans' connection with the steam engine, this much we can safely say, that he early conceived the idea of using steam of high pressure, that he lost no opportunity to bring his views to the attention of those whom he thought could assist him in the realization of his hopes; that he built a successful steam engine in 1802; drove a heavy wagon by steam in 1805, and propelled a boat by steam-driven paddle-wheels the same year. That the type of engines he designed (small diameter of the cylinder and long stroke) continued for many years the distinctive American engine. We see that he helped to overcome, by his personal exertions, the universal fear of high pressure steam, and introduced a type of engines which, by their lightness and cheapness, were fitted for the needs of a new settlement. But that he was the first man to conceive the idea of using high pressure steam is scarcely probable; that he originated the locomotive is very doubtful. A Frenchman named Cugnot built a model high-pressure traction engine in 1769, which ran for a time about the streets of Paris, until it upset, and was, with its inventor, promptly cast into prison. The next year he made a second, which is still in existence in Paris, and failed, chiefly because its boiler was too small. In 1784 Murdock made a model high pressure engine, and Watt, in his patent, put forth the idea of a steam carriage for common roads. This was two years before Evans applied for his patent in Pennsylvania. In 1800, Trevethick made an engine with beam, cylinder 19 inches diameter, 5 feet stroke, and, in 1802, he took out his patents. There are certainly many points of similarity between the engines of Trevethick and Evans, but I do not think it is proved that the former copied the drawings of the latter, or even appropriated his ideas. It is much more likely that the two inventors, having the same goal before them, endeavored to arrive at it by the same means, or, as Oliver Evans says of another, "it frequently happens that two persons, reasoning right on a mechanical subject, think alike and invent the same thing without any communication with each other."

In the *Emporium of the Arts and Sciences*, published in Carlisle, Pa., 1812, Evans repeated his oft-quoted prophecy as to the future of the railroad, which was as follows:

"The time will come when people will travel in stages moved by steam engines from one city to another, almost as fast as birds fly—fifteen to twenty miles an hour. Passing through the air with such velocity—changing the scenes in such rapid succession—will be the most exhilarating, delightful exercise. A carriage will set out from Washington in the morning, and the passengers will breakfast at Baltimore, dine at Philadelphia, and sup at New York the same day.

"To accomplish this, two sets of railways will be laid so nearly level as not in any place to deviate more than two degrees from a horizontal line, made of wood or iron, on smooth paths of broken stone or gravel, with a rail to guide the carriages so that they may pass each other in different directions and travel by night as well as day; and the passengers will sleep in these stages as comfortably as they do now in steam stage-boats. A steam engine that will consume from one-quarter to one-half a cord of wood will drive a carriage 180 miles in twelve hours, with twenty or thirty passengers, and will not consume six gallons of water. The carriages will not be overloaded with fuel or water. * * * And it shall come to pass that the memory of those sordid and wicked wretches who oppose such improvements will be execrated by every good man, as they ought to be now.

"Posterity will not be able to discover why the Legislature or Congress did not grant the inventor such protection as might have enabled him to put in operation these great improvements sooner—he having asked neither money nor a monopoly of any existing thing."—*Extract from Address to the People of the United States.*

Freight-Car Brake Tests.

THE committee of the Master Car Builders' Association, which has charge of the tests of freight-car brakes, which are now in progress at Burlington, Iowa, has issued a pamphlet, giving the character and conditions of the tests, of which the following is an abstract:

"Each brake company must furnish 50 box-cars equipped with its brake on both trucks of each car.

"The first tests will begin on July 13 at Burlington, Iowa, after which the cars will be returned to their owners, and the brakes subjected to an endurance test by being put into general service, until the second test is made in April, 1887. In the meanwhile a record of the mileage of the cars and the cost of repairs to brakes will be kept.

"In April, 1887, the cars will be returned to Burlington, and, without being prepared for trial, the July test will be repeated.

"Two eight-wheeled 'American' engines with 17 by 24 inch cylinders, and not less than 51,000 lbs. on the driving-wheels, will be used in the Burlington tests. One engine will be equipped with the Westinghouse driver brake, and the other with the Eames vacuum driver brake. Both tender-trucks to be fitted with brakes, each brake company to have the option of selecting either of these engines for use in the trial of its brake.

"Competitors will be required to submit to all the tests that are decided upon by the committee."

The pamphlet referred to then gives very minute directions for making the tests. The Westinghouse Air Brake, the Eames Vacuum Brake, the Rote Brake, the American Driver Brake, and the Widdifield & Button—have entered for the contest. On the first day of the test the Rote Brake was withdrawn for thirty days, pending modifications.

There is said to be a large attendance of persons at Burlington who are interested in the trials.

The Old, Old Story.

ON the night of July 8th what might have been an appalling accident occured to the accommodation train which left New York for New Haven at 6.45 P. M. Between Westport and Green's Farms the train stopped because one of the eccentrics broke. Brakeman Mattoon was sent back to signal an approaching freight train. By the rules of the road he was required to go back with his lantern 1,200 yards, and then he would be called in to a distance of 900 yards from the train. He did not go more than half that distance, and a Harlem River freight train of twenty-seven cars came thundering on at a rapid rate. Every effort was made to stop the ponderous train after it saw Mattoon's signal, but in vain, and it struck the rear car of the standing passenger train with considerable violence. Most of the passengers had jumped from the cars, but there were a few remaining in them, and they were more or less shocked and injured. The engineer of the freight train, Samuel Close, was seriously injured, and the wreck caused by the collision was not cleared for three hours.

Freight Rates on Cotton Goods.

AT a meeting of many prominent dry goods merchants, held at the Merchants' Club on July 12th, resolutions were adopted in regard to the present freight tariff charged by the trunk lines on cotton goods manufactured in the east, which are carried as first-class freight. The eastern manufacturers and wholesale merchants regard this as unfair, especially as the railroads south and west of Chicago carry this class of goods to that city as fourth and fifth, and, in some cases, even as sixth-class freight, thus influencing the retailers to buy these goods in Chicago rather than in New York. The resolutions of the merchants provided as follows: "That a committee be appointed by the chair, whose duty it shall be to confer with the representatives of the trunk lines of railroad and again ask relief from this burdensome discrimination, and, in default of the desired relief, to take measures to secure the decision of the Supreme Court of the United States upon this important question." The following committee was appointed: Charles S. Smith, Cornelius N. Bliss, Joseph H. Weller, J. Howard Sweetser, Daniel Robinson and T. L. Greene.

Street-Car Consolidations.

IT is said that negotiations are still continuing between the Metropolitan and the Highland Street-Railway Companies in Boston looking to a consolidation. While nothing definite has as yet appeared officially, it is known that the arrangement will probably be upon the basis of the consolidation of the two into a new company, as the Highland will not be bought or leased. The Middlesex, running to Charlestown, Somerville, and Malden, is also negotiating with the South Boston Road for a consolidation. These two do a large share of the railroad-station travel. The Metropolitan and the Highland compete for business from the city proper to Roxbury or the Highland District.

PRESIDENT CLEVELAND vetoed the bill granting to railroads the right of way through the Indian Reservation in Northern Montana. The President says: "The bill now before me is much more general in its terms than those which have preceded it. * * * It ignores the right of the Indians to be consulted as to the disposition of their lands. * * * It invites a general invasion of the Indian country. * * * I am impressed with the belief that the bill under consideration does not sufficiently guard against an invasion of the rights, and a disturbance of the peace and quiet of the Indians on the reservation mentioned; nor am I satisfied that the legislation proposed is demanded by any exigency of the public welfare."

ON the 24th of June, the midnight express from Brussels to Antwerp had a narrow escape. When traveling at a high speed near the station of Vieux-Dieu, a driving-wheel tire broke, causing the engine to leave the line. Only the tender and guard's van followed, and the whole train was safely brought to a stand in a very short distance by the aid of the Westinghouse brake, and without injury to a single passenger.

AT Krupp's, in Essen, a railway truck has just been built with 16 axles. It was made for the special purpose of transporting by rail a cannon, which is 50 feet long and weighs nearly 136 tons, from Essen to Spezzia in Italy, by way of the St. Gothard tunnel. The truck is 76 feet long, and the axles are divided into groups of four, which easily adapt themselves to the curves of the road.

THE gross receipts of the twenty-two principal railways in the United Kingdom, for the week ended June 20, amounted, on 15,289½ miles, to £1,315,227, and for the corresponding period of 1885, on 15,120 miles, to £1,216,-652, an increase of 169½ miles, or 1.1 per cent., and an increase of £98,575, or 8.1 per cent. the receipts including the Whit week traffic.

A FIRM of lumber dealers in Ellenville, N. Y., has taken a contract for supplying 30,000 ties for a new railroad to the iron mines in the Province of Arragon, Spain. The ties are to be first quality oak or chestnut timber, and to be delivered by boatload, via. the Delaware & Hudson Canal, at the New York docks.

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THE STANDARD HEIGHT OF DRAW-BARS FOR FREIGHT-CARS.

IT has been known for a long time that one of the most prolific causes of accidents in coupling cars is due to the varying height of their draw-bars. For that, and for other reasons, the Master Car-Builders' Association soon after it was organized took the matter up and attempted to establish a standard height for this important organ, it may be called, of freight-cars. In 1872, after a somewhat acrimonious discussion, the association recommended 2 feet 9 inches as the standard height, but, unfortunately, the resolution which was then adopted did not specify whether this height was to be measured when the car was loaded or empty, and, consequently, for years thereafter, some of the members built their cars with draw-bars of that height above the tops of the rails, when the cars were new and empty whereas others made allowance for the effect of the lading, and aimed to have the draw-bars 2 feet 9 inches above the rails when loaded. Still other companies established standards of their own and paid no attention to the action of the Master Car-Builders' Association. It seems probable, too, that there were among the members of that organization a considerable number who were ignorant of its action, or who never took the trouble to make their practice conform to what the association recommended.

At the annual convention of the Master Car-Builders' Association held last year, a committee was appointed "to submit detailed drawings of dead-blocks to be adopted as standards by the association." The main portion of this report is published on another page, and, as shown in a table, which forms a part of it, there is still a good deal of difference in the height of draw-bars of the principal railroads of the country, and a still greater variation in the height of dead-blocks. The committee therefore presented to the Master Car-Builders' Association the following question: "With the prevailing practice described, what is the best method to adopt to secure uniformity? Is it to adhere to the standard which was adopted fourteen years ago, or would the end aimed at be best secured by a modification of it to suit the existing practice of the principal lines?"

The Railroad Commissioners of the State of New York have recently been testing various automatic car-couplers, and their report will be found on another page. In this report they recommend the general adoption of the Master Car-Builders' standard height of draw-bars and dead-blocks. By referring to the table which forms part of the report of the committee on dead-blocks, it will be seen that the standard height of draw-bars of the New York Central, New York, Lake Erie and Western, Pennsylvania, and Baltimore and Ohio railroads is greater than

the standard of the Master Car-Builders' Association. The same thing is true, but, to a greater degree, of the height of dead-blocks. All of the four roads named have a considerable mileage in the State of Ohio. Now supposing that the Ohio Railroad Commissioners should take the matter up, what height of draw-bar are they likely to recommend? Would they probably ask the four principal lines in the State to abandon their practice and conform to that of lines which own a much smaller number of cars, and which have little or no mileage in Ohio? The next step to a recommendation of the commissioners s legislation compelling railroad companies to conform to what has been recommended. If the idea once gets fairly into the minds of legislators and the pub ic, that variation in the height of draw-bars and dead-blocks increases, materially, the danger of coupling cars, and interferes more or less with the interchange of traffic, it will probably not be long before there will be some compulsory legislation thereon, similar to the laws referring to automatic couplers, which so many of the State legislators have adopted. When this time comes, it will be of the utmost importance that there should be agreement among the principal railroads of the country regarding the standard height for both draw-bars and dead-blocks. It is to be regretted that all the railroad companies did not adopt the standards recommended years ago by the Master Car-Builders' Association, but the fact remains that they did not, and that the cars which conform to those standards are a minority. It is very much easier to raise cars up than it is to lower them. All that is required to increase the height of draw-bars is to block up the center-plates and side-bearings.

For these reasons the committee recommended an increase in the standard height of draw-bars and dead-blocks. This excited a very animated discussion at the convention, which resulted in a refusal to adopt the first two recommendations of the committee. This action indicated that the members who carried it through were either indifferent to the matter of uniformity, or else that they thought it would be more certain to be brought about by adhering to the action taken in 1872. With the great trunk lines united in favor of the committee's recommendations, they will be almost sure to be carried ultimately. If, in fact, when the question was decided, the representative members had voted in proportion to the number of cars owned, as they have the right to under the constitution, the result would probably have been different from what it was.

It should also be noticed that, at the same meeting a committee which was appointed to report on a standard height for draw-bars for passengers-cars, recommended that it be 34½ inches. This was referred to a letter ballot for decision. If adopted, there will then be three distinct standards for the height of draw-bars, 33 inches adopted by the car-builders in 1872; 35, the standard of the Pennslyvania system, the Baltimore and Ohio, and other main lines of road; and 34½, the standard for passenger-cars. If the recommendations of the committee, that the standard height be not more than 35 inches when the car is empty, nor less than 33 inches when it is loaded, had been adopted, it would have been accepted by the committee on the height of draw-bars for passenger-cars, and there then would have been one standard for all cars. As it is, the whole matter is in a confused condition, so that it is quite certain to force itself on the attention of the Car-Builders' Association again in the future, and ultimately it will be decided upon broader principles than those which seemed to animate some of the members who helped to defeat the recommendations of the committee, which, if adopted, would have established a standard to which all the railroads of the country could have made all their cars conform.

THE SEQUEL TO THE LATE STRIKES.

A CONSIDERABLE amount of space in the daily papers is now devoted to reports of the trials and convictions of persons for violation of the laws during some of the recent strikes. This is, no doubt, part of an evolutionary process through which the rights and duties of those who earn and those who pay wages will be more clearly defined. There can be no doubt of the fact, as remarked by Prof. Fawcett in a chapter on this subject, part of which is reprinted on another page, that "strikes are inseperably associated with our present economic system." They must be recognized, and means must be provided for deciding disputed points, just as we do in political questions and contests. Until quite recently many employers took the ground that they would not "recognize" a trade union, or a representative committee of their employés. Most employers now see that such a position is unfair, and therefore untenable, and the right of workingmen of being heard through a representative committee, is now very generally recognized; and that fact is a distinct advance in what may be called the jurisprudence of the labor question.

But, on the other hand, the workingmen, through their unions, have repeatedly demanded the right of prescribing whether certain persons shall or shall not be permitted to work for their employers, and have demanded that members of their unions should not be discharged without the sanction of their organizations. They have also claimed and exercised the right of conspiring to injure and destroy the business of those who would not do or leave undone what the unions demanded. Now, if these views were distinctly formulated, and if there was any real danger that

they would displace our present system of law, it would at once create a revolution, and thousands would be ready to shoulder their muskets to resist them. The astonishing thing is, that the workingmen do not seem to see this. Doubtless, the recent trials and convictions of those guilty of illegal acts, the clear statements of law and equity in such cases by the judges, will do much to give the members of trades unions a clearer apprehension of their rights and duties; and it may confidently be anticipated that they will soon abandon the right to boycott, and of prescribing that certain person shall or shall not be employed. When this is done, and when employers distinctly recognize the right of those who work for them of belonging to trades unions, without prejudicing the one against the other, and are willing to give a fair hearing to any committee of their own employés, then we may look for the advent of more of what some one has called "sweet reasonableness" into the councils of employers and employés.

STIRRING UP STRIFE.

IT is said in a certain old book, which was more venerated some time ago than it seems to be now, that the peace-makers are blessed. It is to be feared that this benediction will not fall upon the heads of the editors of the *National Car and Locomotive Builder*, if they persist in their effort to stir up strife in an association which that publication might be expected to shield with a mantle of charity. Instead of doing that, it publishes an invidious and anonymous letter, and then comments thereon in a manner quite certain to stir up animosity between "two distinct elements in the association." One of the objects of the association, according to its constitution, is "to provide an organization through which the members, and the companies they represent, may *agree* upon such joint action as may be required to bring about uniformity and inter-changeability in the parts of railroad cars." Does our cotemporary honestly think that he assists "*agreement*" when he emphasizes the fact that, "there are two distinct elements in the association," and intimates that the one is "sanguine, opinionated, overweening and confident, * * added to a rattling volubility * * * with a plentiful lack of safe conservatism which comes from large experience * * * with a pretty clearly revealed purpose to make the association subservient to the interests of a great leading road and its affiliated lines?"

The most important and, at the same time, often the most difficult end to be attained by the meetings of the car-builders' is to secure *agreement*. Our cotemporary knows, or should know, this. It has found fault repeatedly because the association has not established standards as rapidly as it should. In substance, then, it has said to the car-builders, "you should meet, and reason, and agree together, but some of you are opinionated, overweening and filled with rattling volubility, and trying to shape the action of the association upon controverted points so as to favor the ascendency of a particular interest." Verily, this is pouring vitriol and not oil upon the troubled waters.

EDITORIAL NOTES.

THE reports of the progress of the trials of automatic brakes, on the Chicago, Burlington and Quincy Railroad, at Burlington, which have thus far reached us, are very meager, but the descriptions of the arrangements for the trials which have been published, indicate that they are very complete, and that they have been devised with a very thorough knowledge of what is essential in making such experiments. Great credit is due to the committee, and especially to its chairman, Mr. GODFREY W. RHODES, superintendent of machinery, of the Chicago, Burlington and Quincy Railroad, who made all the arrangements for carrying out this elaborate series of experiments. The Chicago, Burlington and Quincy Railroad has set an example, by furnishing the facilities for making these tests, which other roads might imitate with credit to themselves, and advantage to the whole railroad system of the country and to the public generally.

* * *

FAST hotel trains are rapidly becoming popular. All the great lines from this city now run them west. The New York Central has lately put in operation a system which wins high praise from its patrons. When the vast convenience of such a plan is considered, the price at which the luxury is supplied seems little less than miraculous economy.

* * *

THERE seems to be a present lull in the war of rate-cutting—and a very good thing too. A few passengers who at the time take advantage of cut-rates may benefit thereby; but it is otherwise a suicidal policy. May peace be permanent!

Specifications for Railroad and Canal Construction. By John H. Yates, C. E. Chicago: *The Railway Age* Publishing Company.

There is a class of books which always lead some readers to wonder why the authors, after making them as good as they are, did not take more trouble and make them much better. The book whose title has been given is one of this class. It makes no pretense to originality, it is true, but the author might at least have aimed at more completeness. Thus, under the head of railroad bridges, we find specifications for pile and trestle bridges, and nothing more; and for canal bridges we have information concerning Whipple's patent iron-arch truss! The wonder is where the writer exhumed such relics of antiquity. To sum up, the book is simply technical hash, which is not very pleasing to the appetite, but nevertheless contains some nutrition.

Street-Railways.

American Street-Railway Association.

President.—Julius S. Walsh, President Citizens' Railway Company, St. Louis, Mo.

First Vice-President.—William White, President Dry Dock, East Broadway and Battery Railroad Company, New York City.

Second Vice-President.—C. B. Holmes, President Chicago City Railway Company, Chicago, Ill.

Third Vice-President.—Samuel Little, Treasurer Highland Street-Railway Company, Boston, Mass.

Secretary and Treasurer.—William J. Richardson, Secretary Atlantic Avenue Railroad Company, Brooklyn, N. Y.

Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

The Fifth Annual Convention of the Association will meet in Cincinnati, O., on Wednesday, October 20th, 1886.

ELECTRICITY AS A MOTIVE-POWER ON RAILROADS.

AT the last meeting of the American Street-Railway Association, a committee made a report on "The Progress of Electricity as a Motive Power," the conclusions of which are that "the committee consider the application of electricity to the propulsion of street-cars as entirely feasible. The seven electric railways in Europe, besides the tests in this country, prove this to be true. It is now narrowed down simply to a question of dollars and cents, or comparative economy with horses, cable power, etc."

The "question" to which the committee say this whole subject is narrowed down, it must be admitted, is a rather important one. In fact, it is of so much importance, that until it is answered satisfactorily, there is no hope that electricity will displace horse, steam, or cable power. The reports of recent experiments in this direction which have been made public, while they are very incomplete, are, nevertheless, not at all assuring or promising that electricity will speedily come into use as a motive power for street or any other railroads.

In the discussion which followed the reading of the report referred to, inquiry was made of the working of the Bentley-Knight system of electrical motors which was tried on the East Cleveland road. Mr. HERRICK, of Cleveland, reported that "it has not proved such a success as to satisfy us that we can wisely adopt it. It answered the purpose at first, and the cars seemed to run very well. Without going largely into details, I can say this, tha it seemed to be controlled well in starting and stopping; that there was not much difficulty in regard to that part of its work, but the speed could not be regulated very well. * * * We had it there something over a year. The owners made every effort to improve it; and finally it has been given up without any further efforts in the line of improvement."

During the same discussion a letter from Mr. T. C. ROBBINS, general manager of the Baltimore Union Passenger Railway, on which the Daft electric system of motors is in use, was read. In this letter Mr. ROBBINS says: "The electric power necessary to run ordinary street-cars can be furnished by use of steam to generate the electricity for one-half the cost of horse power." * * In conclusion he says, "while we have not had the motors in operation long enough to determine the percentage of cost, as compared to horse or mule power, I am satisfied that it will be in favor of electricity, especially on car-lines of ten cars and upwards." This sounds very much like saying that "electricity is cheaper, but we don't know what it costs."

Of Mr. EDISON'S celebrated experiment at Menlo Park, Mr. RICHARDSON, of Brooklyn, said: "The motive power was supplied by a very expensive establishment, so far as the steam engine is concerned, some of us thinking that it ought to furnish the power to move a hundred cars instead of only one; and the whole effect of that experiment, in my mind, was that it indicated far too great an expense for it to be considered in the light of a successful experiment to be applied to an ordinary city street-railroad. The power was there and the car moved rapidly, but I think that, in the judgment of all present, there was nothing shown to us as to its practicability in the most important sense of that question: Will it pay?"

In an address, delivered in Melbourne, Australia, by Mr. HALLIDIE, of San Francisco, the originator of the cable system of railroads in the latter city, he said that one of the directors of the Compagnie Générale des Omnibus in Paris had said that they had experimented on thirteen different methods of dispensing with horses; that electricity was the last and the most expensive experiment, and that, after all, they had returned to horses, and determined to make no further experiments.

On the elevated railroad in New York, three different parties have been experimenting with electrical motors with very doubtful success. Two of them have abandoned the experiments, and the third is continuing them in a very spasmodic way, with apparently very little promise of a favorable result.

For some reason, the testimony to show that electricity is an economical medium of applying power on railroads is very slow in making its appearance. It would, of course, be great folly for any one to assert, at the present time, that the use of electricity as a motive power will not ultimately be made as economical as horses, cables or locomotives; but at present there is obviously a gap which inventors have not been able to bridge over. It is not the purpose of this article to discourage investigation and experiment in this direction, but, if possible, to restrain inventors of electrical motors from making extravagant claims, and lead them to be more careful in collecting

and stating the proof of the success of their inventions; and to recommend caution in accepting and believing their "claims."

THE gay and elusive Mr. SHARP still appears to be invulnerable, so far courts and prosecutions as yet concern him. The daily press continues a laudable outcry and effort to enroll him as a member of the ignoble army of martyrs, but judging from the present singularly apathetic temper of the powers that be he still has a long lease of freedom.

* * *

STREET-RAILWAY labor in this city is at present in a marvelously peaceful and quiet condition. Even the smoke of former battles appears to be blown far away and out of sight, while quiet reigns. If labor only knew it, the present is the condition best conducive to its interests; but it is hard of conviction.

* * *

THE Broadway surface road controversy is still unsettled. The receivers and their opponents keep up the fight, and probably will as long as ammunition lasts. A speedily emptied magazine would be a blessing to the city.

MOTIVE POWER.

BY MARVIN C. WILLIAMS.

[Written for the AMERICAN RAILROAD JOURNAL.]

IN view of the universal and extensive experiments which have of late years been made, it seems not a little singular that, so far as motive power is concerned, street-railways are practically where they were at their inception.

It is true that in the nature of the case the room for improvement is somewhat limited. It is not as with the steam lines, where there is an almost unlimited opportunity for the application of invention and resource, guided by experience. The street-railway was, at its birth, almost full-grown; still, in certain features, the system has undergone the improvement and perfecting which time brings about, and save in one direction, is about fully developed, and this is motive power, for while it is true that there are surface-roads in cities which do not use horse traction, the majority of cases wherein it is employed is so vast that the minority can only rank as experiments, and not improvements.

To those familiar with the bent of inventive genius, and under whose observation patents constantly are passing, it is a matter for astonishment that so little practical has survived the vast amount of labor and ingenuity spent on solving the problem of a satisfactory street-railway motive power. The cable and dummy-engine have, of course, received the bulk of attention from inventors, and numberless contrivances and devices have been brought into play in the endeavor to solve the problem, with necessarily very great expense. In addition to these two principal means of propulsion outside of horse-flesh, there have been many other methods devised and experimented with, besides many modifications of the two first mentioned. So far as the dummy-engine is concerned, at least in populous cities, the system seems conceded to be a failure; for while a few years since the dummy was by no means an uncommon sight in much-traveled streets, it has now utterly disappeared. The principal objection to its employment as a motor for street-cars was the apparent impossibility of ever teaching the ordinary street horse to view it with equanimity, and its continued use was attended with so many accidents from this cause, and being a constant menace to life and limb, it was by common consent relegated to obscurity.

It is also doubtful whether, aside from the above cogent reason, it could be considered a success, judged by either a financial or mechanical standard. Opinions and reports on the former point differ widely, but it is nowhere plainly shown that its adoption would be attended by great saving, while from the latter there are serious drawbacks. In our Northern cities it is specially desirable that if a car leaves the track the motive power is not compelled to follow it. If a horse-drawn car becomes derailed by snow, the power, being entirely independent, is able to exert itself in any desired direction, and it is thus not difficult to remedy the mishap. Such, however, is not the case with the steam street-car. Derailed it is, so far as concerns the original power, a hopeless cripple, and must rely on outside aid.

So far as this difficulty is concerned, the cable seems to present less that is objectionable than any other substitute for horses; but there is the trouble of keeping the slot clear, with many other vexatious disadvantages; but so far the system seems the best known, and, like almost everything, is susceptible of great improvement.

Taken all around, however, the horse-car *per se* would appear to give the best general results, but it is very evident that in the solution of the problem a wide field is open to inventors, and he who finds the answer will reap a rich reward.

Cable Railways in Massachusetts.

MR. LILLEY, of Middlesex, for the committe on street-railways, reported the following bill in the House June 21st:

SEC. 1. Any street-railway company which is now, or may hereafter be formed, may, with the approval of the board of aldermen of cities and selectmen of towns, establish and use the cable system of motive power, so called, for the purpose of operating its road, and may, with the approval and under the direction of the board of aldermen of cities and selectmen of towns, make such underground or surface alterations in the streets or ways through such railway passes as may be necessary to the purpose, subject, however, to the provisions of chapter 113 of the Public Statutes, so far as the same are applicable.

SEC. 2. Any street-railway company, operated by cable motive power, so called, which enters upon and uses the tracks of another in the manner now provided by law may, with the approval of the board of railroad commissioners, use the cable motive power of such other company, and for such use shall pay such compensation as the board of railway commissioners shall from time to time determine.

The manner and time of payment of such compensation to be fixed by the commissioners, after hearing, in the manner provided by chapter 112 of the Public Statutes for compensation for the use of motive power by connecting railroads.

SEC. 3. Any street-railway company for the purpose of carrying into effect the provisions of this act may increase its capital stock in the manner provided by sections 58, 59 and 60 of chapter 112 of the Public Statutes, for increase of capital stock of railroads.

SEC. 4. The provisions of chapter 113 of the Public Statutes relating to the formation of street-railway companies shall, subject to the provisions of this act, apply so far as possible to street-railway companies in whole or part by the cable system of motive power, so called, the same as though such street-railway companies were operated by animal power.

SEC. 5. This act shall take effect upon its passage.—*Street-Railway Journal.*

Cable Tramways in Melbourne.

THE citizens of Melbourne, Australia, having found themselves in need of means of inter-communication, both as regards the city and suburbs, the authorities decided upon the adoption of cable tramways. They had precedents in the United States of America, in Dunedin, New Zealand, and in our own tramway line at Highgate. They are now laying down an important series of lines in Melbourne on the cable system, involving an expenditure of of about a million and a half sterling. The wire cables of these lines are being manufactured at the works of Messrs. Bullivant & Co., Blackwall. There are two ropes, one being 4,340 fathoms, or nearly five miles, and the other 2,459 fathoms, or over two and three-quarter miles in length, and weighing, respectively, about 24 tons and 16 tons each. They are composed of a hemp core enclosed spirally by six wire strands, each strand consisting of 31 wires. Each rope is 3⅜ inches in circumference, and has the high breaking strain of 150 tons per square inch of sectional area.—*London Times.*

A Cable Road for Third Avenue, New York.

THE Third Avenue (surface) Railroad Company, of New York, proposes to change their horse-car line into a cable road. It will be divided into three sections, one extending from the depot at Sixty-fifth street to Harlem; another from the depot to Sixth street, and a third from Sixth street to the terminus of the road in front of the Post Office. The road is a little over eight miles long. The entire system of cables will be duplicated, so that in the event of one of the cables breaking, or any part of the machinery giving out, a second one can immediately be set in motion.

A New Terminus for the Long Island Railroad at South Ferry.

IT may be remembered by persons who are uncomfortably near or uncomfortably far from fifty, that a good many years ago the Long Island Railroad had one of its termini at South Ferry in Brooklyn, which was approached by a tunnel in Atlantic avenue. This for some reason was closed, and, no doubt, the Long Island Railroad Company has often had occasion to regret it. It is now said that Mr. Corbin proposes to build an elevated railroad from the foot Atlantic avenue, Brooklyn, to East New York, *if* the Brooklyn common council will give its consent. Perhaps only Mr. Corbin knows how formidable an obstacle is represented by that "if," but it would, undoubtedly, be a great advantage to his road, and give very much needed facilities to those who do business in New York and who want to live on Long Island, of whom there are, doubtless, a good many.

STREET-RAILWAY NEWS.

ALABAMA.

THE Birmingham & Pratt Mines Street-Railway Company claims the exclusive right to build a line to Elyton; and has so notified the Birmingham Street-Railway Company which has been proposing to construct a line over the same route.

ARKANSAS.

G. W. Baxter, of Hot Springs, Ark., proposes to build an inclined plane railroad at Eureka Springs to the top of West Mountain, where he intends to erect an observatory and lay out pleasure grounds.

COLORADO.

The Denver Electric Street-Railway is progressing, and the track-laying is going ahead.

The Denver Tramway Company has been incorporated. Capital stock, $500,000. Rodney Curtis and others, incorporators.

CONNECTICUT.

The capital for the proposed horse railroad in Meriden has nearly all been subscribed.

DAKOTA.

A street railroad is talked of for Sioux Falls; the scheme will probably take a definite shape this year.

DISTRICT OF COLUMBIA.

The Washington Cable Railway Company is to be incorporated. It is expected that it will meet with considerable opposition from the horse-car lines.

FLORIDA.

The City Council of Palatka has granted the right of way for a street-railroad.

At Tampa the street-cars are hauled by steam engines.

GEORGIA.

A new street railroad is talked of for Covington. Particulars may be obtained from W. C. Clark & Co.

ILLINOIS.

At Bloomington a street-car line out to the cemetery is desired.

The North Chicago Street-Railroad Company has been authorized to operate its line on certain streets, on the cable system; the company will run cable cars through the La Salle-street tunnel. It is charged in the daily papers that there has been considerable bribery in obtaining

the franchise, which has lately been revised by the Mayor to give greater benefit to the city. Philadelphia capitalists are interested.

Princeton people want a street-railway from the Court House to the railroad depot.

KENTUCKY.

The Fourth-Avenue Park Railway Co. has been organized at Louisville.

MASSACHUSETTS.

A bill has been reported to incorporate the Newton Street-Railway Co.

The Hoosac Valley Street-Railway was not abandoned after all, and is now under construction. The objection was not to the line, but to the manner in which it was originally designed to be carried out. The locomotives have been delivered at North Adams and are reported to be similar to those in use on the elevated railroads.

The Plymouth & Kingston Street-Railway Co. has a capital stock of $20,000. D. Thurber is President.

The Winthrop Electric Railway Company has been incorporated with a capital of $30,000. Erastus H. Doolittle, J. A. Enos, and others are interested.

The new street-railway company at Worcester has sold out to the old company, and will consolidate with it, when permission is obtained from the Legislature.

MICHIGAN.

On the Van Depoele Electric Railway between Detroit and Dearborn, a distance of three miles, a single train will be run, consisting of six large street-cars, at a speed of 15 to 20 miles per hour.

The Highland Park Railway Company has been incorporated at Detroit. Capital $50,000. Frank E. Snow and others.

At Grand Rapids the city authorities have passed a resolution declaring a street-railroad on certain streets to be a public necessity, and providing that if the present company does not commence within a stated time, other parties shall be permitted to do the work.

MINNESOTA.

The Mankato Street-Railway Company has filed articles of incorporation. W. W. Farr, S. Lamm, and others, all of that city. Capital, $50,000.

The Stillwater Street-Railway Company has been incorporated with a capital stock of $100,000. The other company has withdrawn its proposition.

MISSOURI.

At St. Louis, Thos. O'Reilly has applied for a franchise to build an electric elevated railroad four and a half miles long. The line is to be constructed in the middle of the street.

NEW JERSEY.

A New York syndicate proposes to build a street-railway in Plainfield.

NEW YORK.

An experimental trial of a new electric motor was made recently on the 34th street branch of the Third Avenue Elevated Railroad.

Mr. Richardson, President of the Atlantic Avenue Railroad Co. (Brooklyn), has applied to the Common Council for authority to substitute cable for horse traction from Fulton Ferry to the Prospect Park and Coney Island Railroad at the city line.

The Canandaigua Street-Railroad Company, capital stock $30,000, has been incorporated by F. Chamberlain and others.

The Jamestown Street-Railroad Company recently had a switch torn up by order of the City Council; subsequently, however, the company obtained permission to relay the same switch.

At Randolph a new street-railway is in contemplation. T. L. Higgins, of Fredonia, can furnish information, plans, etc.

The Seneca Falls and Waterloo Railroad Co's. extension to the Lake is progressing rapidly. A hotel is to be built at the Lake.

The Woodlawn and Butternut Street-Railroad Co. of Syracuse, has been incorporated by Peter Kapesser and others. Capital $30,000.

PENNSYLVANIA.

The Traction Company, of Philadelphia, has introduced an electrical alarm system on its Market street line. The wires are laid in the conduit and can be operated from any manhole. It is to be used in the event of there being any accident to the cars.

The Union Electric Company has been operating its experimental car on Ridge avenue, Philadelphia. A conduit 4½ inches by 9 inches contains the conductors, on which runs a traveler connecting with the motor on the car by wires. The comparative cost per day, including salaries, of horse and electric cars are estimated at $4.74 and $1.84 respectively.

The Brownsville Avenue Street-Railroad Company of Pittsburgh, will build a line from Carson street to the city line and thence to Knoxville. Horses or electric motors will be employed.

The East End and Wilkinsburg Electric Railway, in Pittsburgh, is approaching completion.

SOUTH CAROLINA.

A street-railway is to be built in Columbia. A company has been incorporated by T. D. Gillespie and others, with a capital of $50,000.

TEXAS.

The Alvarado Street-Railroad Company has commenced work on its line.

The Gulf City Street-Railroad Company of Galveston, has been refused an extension of time to complete its connections.

The Waco Street-Railway Company will extend its line two miles.

MISCELLANEOUS.

The Assembly has passed the bill authorizing any horse street-railroad company to change its line to the cable system on obtaining the consent of one-half the property owners along the route.

In the United States there are 233 towns and cities which have horse-railroads; the aggregate length of lines is 3,340 miles, and they employ 84,577 horses and 16,843 cars.

Manufactures.

THE ROGERS LOCOMOTIVE AND MACHINE WORKS.

THIS company has recently had a new descriptive catalogue prepared, which contains a very interesting account of the origin of this establishment, and of what may be called the mechanical evolution of the locomotive in these works. The following extracts are made from advanced sheets. Other parts of this interesting history will be published in succeeding numbers of the JOURNAL:

CHAPTER I.

The Rogers Locomotive and Machine Works were founded by Thomas Rogers, who was born March 16th, 1792, in the town of Groton in New London County, Connecticut. He died in New York City, April 19th, 1856. He served in the war of 1812, and was a lineal descendant of Thomas Rogers, one of the Pilgrim Fathers, who came over to this country from England in the Mayflower. At the age of sixteen he was apprenticed to learn the trade of a house carpenter, and in the summer of 1812 he removed to Paterson, N. J., then a small village, which at that time was very prosperous on account of the demand for American manufactures brought about by the war with Great Britain.

At this time he was employed as a journeyman carpenter, and was noted for his constant application to business, good judgment, and force of character. A few years afterward, Captain Ward, who had been traveling in Europe, where he had seen the power-loom in operation, came to Paterson for the purpose of introducing the manufacture of cotton duck. Mr. Rogers was employed to make the patterns for these looms. He very soon understood their construction and recognized their value, and bought from Captain Ward the patent-right for making them.

In 1819, he associated himself with John Clark, Jr., under the firm name of Clark & Rogers. They commenced work in the basement story of the Beaver Mill, a building which at an early day had been put up by Mr. Clark's father. Shortly afterwards, Mr. Rogers visited Mexico, where he received large orders for looms, etc. In 1820 the firm moved into the little Beaver Mill, and in the following year took into partnership Abraham Godwin, Jr., and the firm name was then changed to Godwin, Rogers & Co. They then commenced spinning cotton and building machinery for that and other purposes.

In 1822, finding their accommodations too limited, they leased Collett's Mill and moved into it. Their business continued to increase, the number of persons employed being sometimes as high as 200. The establishment continued to prosper until the summer of 1831. In the latter part of June of that year Mr. Rogers withdrew, and took with him $38,000 as his share of the profits of the firm.

He then took a mill-site on the upper raceway in Paterson, and immediately commenced the erection of the "Jefferson Works," which were finished and put in operation before the close of the following year. The location and building of the "Jefferson Works" was literally an encroachment on the forest. On the upper race no factories had been put up, except two little cotton mills and a small machine shop, the latter owned by Messrs. Paul & Beggs. Between Spruce and Mill streets, all was swamp covered with pines.

It was the intention of Mr. Rogers to devote the lower stories of the "Jefferson Works" to building machinery, and the upper stories to spinning cotton. The latter was, however, never commenced, as the demand for machinery increased so fast that the whole of the new building was devoted to that branch of the business.

In the early part of 1832, he associated with himself Messrs. Morris Ketchum and Jasper Grosvenor, of New York, the name of the firm being Rogers, Ketchum & Grosvenor.

In that year the railroad from Jersey City to Paterson was approaching completion, and the iron work for the bridges over the Passaic and Hackensack rivers had been made by Mr. Rogers. An order was also executed for one hundred sets of wheels and axles for the South Carolina Railroad, of which Mr. Horatio Allen was the chief engineer. A short time before Mr. Allen had visited England to get information about the use of locomotives on railroads, and at the time he ordered the work for the South Carolina Railroad he recommended Mr. Rogers to undertake the construction of locomotives.

In the following letter, written more than fifty years after the event, Mr. Allen describes his interview with Mr. Rogers:

"SOUTH ORANGE, N. J., December 31st, 1884.

"DEAR SIR:—The earliest railroad work in this country was done by the West Point Foundry Association, to which was entrusted the order for railroad wheels for the South Carolina Company, and other work for that company.

"Knowing that the era that had opened would require works specially appropriate to the construction of the rolling-stock up to the locomotives, I obtained authority in the spring of 1830 from the South Carolina Railroad Company to seek the works which in position, instrumentalities, and preparedness, were in condition to undertake and were willing to undertake what was wanted.

"The result of inquiries to the end in view led me to call on Rogers, Ketchum & Grosvenor, a firm then engaged in the manufacture of machinery for cotton and woolen mills, whose works were at Paterson, N. J.

"At these works I called and asked an interview with Mr. Rogers, the partner having charge of all the mechanical operations of the firm. It was without any letter of introduction or any personal knowledge of each other. My subject was my introduction, and Mr. Rogers very soon led me to know that I had come to the right place and to the right man.

"At the close of an hour's conversation Mr. Rogers expressed his readiness to enter the new field, and to undertake any orders that were entrusted to their firm. The future of 'The Rogers Locomotive Works' was determined at that hour's conversation.

"The personal and business relations which followed this interview, continued for many years, and were to me of the most satisfactory character."

"Yours truly, HORATIO ALLEN."

CHAPTER II.

THE EARLY HISTORY OF RAILROADS IN THIS COUNTRY.

In 1833 railroads were already attracting a great deal of attention in this country. The opening of the Erie Canal for commercial purposes in 1826, and the consequent diversion of traffic from other seaboard cities to New York, led the people of Philadelphia, Baltimore, Boston

and Charleston to seek for means by which their lost trade could be recovered. Investigation and accurate surveys soon showed the impracticability of constructing canals from Baltimore to the Ohio river, or from Boston to the Hudson. In the meanwhile information concerning the successful use of steam-power on the Stockton and Darlington Railroad in England, which was opened in 1825, had reached this country, and the public had received the reports of the celebrated experiments with locomotives which were made on the Liverpool and Manchester Railway in 1829. As Mr. Charles Francis Adams, Jr., has expressed it:*

"America suffered from too few roads; England from too much traffic. Both were restlessly casting about for some form of relief. Accordingly all through the time during which Stephenson was fighting the battle of the locomotive, America, as if in anticipation of his victory, was building railroads....

"The country, therefore, was not only ripe to accept the results of the Rainhill contest, but it was anticipating them with eager hope."

After the experiments referred to had been made, full reports giving in detail their results were published in this country, committees of inquiry were sent to England to get information and report on the railroads of that country, and a railroad mania began to pervade the land.

The first railroad which was built in the United States was a short line of about three miles from the Quincy granite quarries to the Neponset river,† for the transportation of granite for the Bunker Hill monument. This was merely a tram road and was operated by horse-power and stationary engines, and was built in 1826. As Mr. Adams says:

"Properly speaking, however, this was never—or at least, never until the year 1871—a railroad at all. It was nothing but a specimen of what had been almost from time immemorial in common use in England, under the name of 'tramways.'"

A similar work was constructed at about the same time for the transportation of coal from the pit's mouth to the Lehigh Valley Canal near Mauch Chunk, Pa.

In the latter part of 1827, the Delaware and Hudson Canal Company put the Carbondale Railroad under construction. This road extends from the head of the Delaware and Hudson canal at Honesdale, Pa., to the coal mines belonging to the Delaware and Hudson Canal Company at Carbondale, a distance of about sixteen miles. This line was opened, probably, in 1829, and was operated partly by stationary engines, and partly by horses. The line is noted chiefly for being the one on which a locomotive was first used in this country. This was the "Stourbridge Lion," which was built in England under the direction of Horatio Allen, then an assistant engineer on this line. It was tried at Honesdale, Pa., in August, 1829.

According to "Poor's Railroad Manual for 1876 and 1877": "It was not until 1828, that the construction of a railroad was undertaken, for the transportation both of freight and passengers, on anything like a comprehensive scale. The construction of the Erie Canal had cut off the trade which Philadelphia and Baltimore had hitherto received from the west; and as the project of a canal from the city of Baltimore to the Ohio was regarded by many as impracticable, the merchants of that city, in 1827, procured the charter of the present Baltimore and Ohio Railroad. On the 4th of July, 1828, the construction of the railroad was begun, the first act being performed by the venerable Charles Carroll, of Carrollton, the only then surviving signer of the Declaration of Independence. At the close of the ceremony of breaking ground, Mr. Carroll said:

"'I consider this among the most important acts of my life, second only to that of signing the Declaration of Independence, if even second to that.'

"In the fall of 1829, the laying of the rails within the city of Baltimore was begun. On the 22d of May, 1830, the first section of fifteen miles, to Ellicott's Mills, was opened.

"The next important railroad was the South Carolina,* begun in 1830, and opened for traffic in 1833 for its whole length (135 miles). At that time, it was the longest continuous line of railroad in the world. The construction of the Mohawk and Hudson Railroad, now a part of the New York Central, was begun in 1830. It was opened (17 miles) in 1831. The Saratoga and Schenectady Railroad (21½ miles) was opened in the following year; the Paterson and Hudson River Railroad was chartered in January, 1831, construction on it was commenced in 1832, and it was opened in 1834; the Cayuga and Susquehanna (34 miles), connecting the Susquehanna river with the Cayuga Lake, was opened in 1834; and the Rensselaer and Saratoga (25 miles) in 1835. In New Jersey, that portion of the Camden and Amboy extending from Bordentown to Hightstown (14 miles) was opened on the 22d of December, 1830; and between Hightstown and South Amboy (47½ miles) in 1834. In Pennsylvania, a considerable extent of line for the transportation of coal had been constructed previous to 1835. In 1834, the Philadelphia and Columbia (82 miles) and the Portage Railroad (36 miles), both forming a part of the system of public works undertaken by the State of Pennsylvania, were opened. The completion of these gave that State a continuous line, made up of canal and railroad, from Philadelphia to the Ohio river at Pittsburgh. The total mileage of railroad constructed in the State of New York up to, and including, 1835, was 265 miles, or more than one-quarter of the whole extent of line then in use in the United States. In 1833, the Baltimore and Ohio Railroad was extended as far west as Harper's Ferry (81 miles). In the same year the Washington branch (30 miles) was also completed. In Massachusetts, in 1835, the Boston and Worcester Railroad (44 miles), the Boston and Providence (41 miles), and the Boston and Lowell (26 miles) were all opened for business. The total mileage in operation in all the States at the close of that year was 1,098 miles."

The preceding sketch of the early history of railroads in this country, is given to show the extent of railroad construction at the time that Mr. Rogers determined to undertake the manufacture of locomotives.

* See "Railroads: their Origin and Problems."

† It has recently been stated that as early as 1809 an experimental railroad track, 180 feet in length, was laid in Delaware County, Pa., and that in the same year a road about a mile long was constructed from stone quarries on Crum Creek to a "landing" on Ridley Creek in the same county and State. The evidence upon which this statement is based has not been made public.

* The original charter of the South Carolina Railroad was granted December 19th, 1827. This was not satisfactory to some of the citizens of Charleston, and a new bill was reported to the legislature on the 22d of January, 1828, and passed on the 29th of the same month. The stockholders organized as a company on the 12th of May, 1828.

Chapter III.

THE EARLY HISTORY OF LOCOMOTIVES IN THIS COUNTRY.

In the latter part of the year 1827, the Delaware and Hudson Canal Company decided to have built in England three locomotives, for their line of railroad from Honesdale to Carbondale. This action was taken on the report of the chief engineer of the road, Mr. John B. Jervis; and Mr. Horatio Allen, then a resident engineer on the line, was deputized to go to England and have the engines built on plans to be decided by him when in England. He arrived there early in 1828, and ordered one engine from Foster Rastrick & Co., of Stourbridge. This was the "Stourbridge Lion" (Fig. 2). Two other engines were ordered from Stephenson & Co., Newcastle.

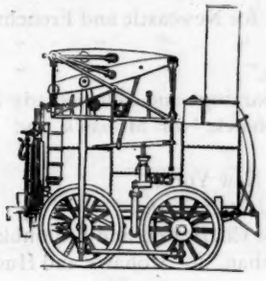

Fig. 2.

In a pamphlet, with the title "The Railroad Era," written by Mr. Allen in 1884, he says:

"The two locomotives from Stephenson that were in New York early in the year 1829, and therefore prior to the trial of the locomotive 'Rocket' in October of that year, were identical in boiler, engines, plan and appurtenances with the 'Rocket' (Fig. 3); and if one of the two engines in hand ready to be sent had been the one used on August 9th, 1829, the performance of the 'Rocket' in England would have been anticipated in this country.

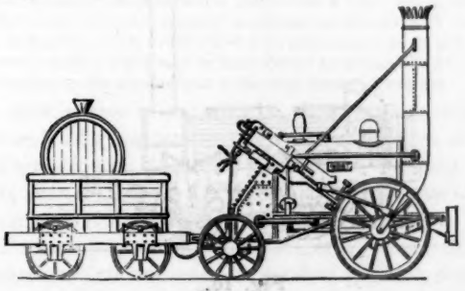

Fig. 3.

"The three locomotives were received in New York in the winter of 1828 and 1829. One of each kind was set up, with the wheels *not* in contact with the ground, and steam being raised, every operation of the locomotive was fully presented, except that of onward motion."

None of these engines were sent to the road for which they were intended, until the following spring. The "Stourbridge Lion," so far as is known, was the only one which was ever placed on the road. It was not tried until August 9th, 1829, and was then run by Horatio Allen, who has the honor of being the first person who ever ran a locomotive in America.

This engine, it was said, was too heavy for the road, and was used only a short time. It is a singular fact that it is not now (1886) known what became of the two engines built by Stephenson & Co., and which were in every essential similar to the celebrated "Rocket."

In August, 1830, Peter Cooper tried his "model of experimental locomotive engine" (represented by Fig. 4) on the Baltimore and Ohio Railroad. This engine had but one working cylinder of 3¼ inches diameter, and 14½ inches stroke of piston. The engine was tried on August

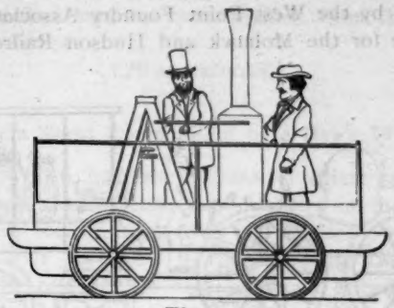

Fig. 4.

28th, 1830. In the same year, the South Carolina Railroad Company contracted with Mr. E. L. Miller to build a locomotive, which was named the "Best Friend," for the South Carolina Railroad Company. This engine (shown by Fig. 5) was put into service in November, 1830, and was

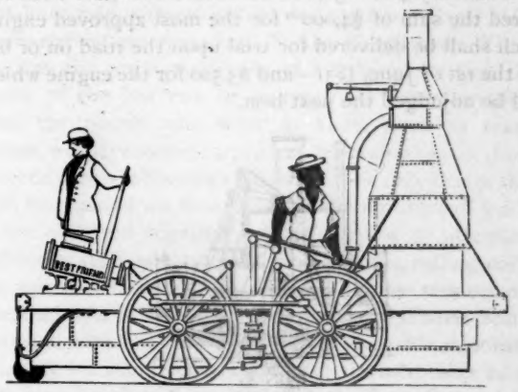

Fig. 5.

the first locomotive ever built in America for actual service upon a railroad.

A locomotive called "The South Carolina" (Fig. 6), designed by Horatio Allen, was built for the South Carolina Railroad by the West Point Foundry Association, in the year 1831. The boiler had its fire-box in the middle,

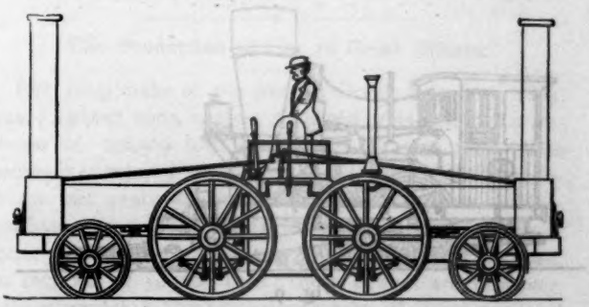

Fig. 6.

with a pair of barrels (four in all) extending each way, with a chimney at each end. The engine had eight wheels, arranged in two trucks, one pair of driving-wheels, and one pair of leading wheels forming a truck. Each truck had one cylinder, which was in the middle of the engine

and attached to the smoke-box. The driving axle had a crank in the middle to which the connecting rod was attached by a ball-joint. The trucks were connected to the engine by king-bolts in the usual way.

The "De Witt Clinton" (Fig. 7) was the third locomotive built by the West Point Foundry Association. It was made for the Mohawk and Hudson Railroad, and

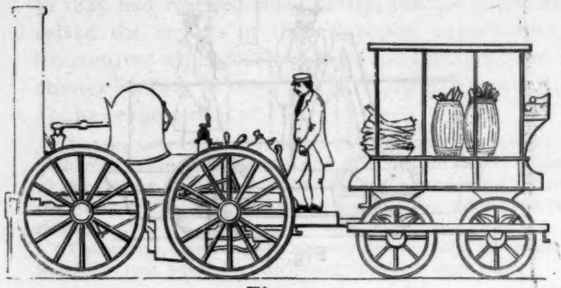

Fig. 7.

was ordered by John B. Jervis, Esq. The first excursion trip with passengers, drawn by the "De Witt Clinton," was made from Albany to Schenectady, August 9th, 1831.

On January 4th, 1831, the Baltimore and Ohio Railroad offered the sum of $4,000 "for the most approved engine which shall be delivered for trial upon the road on or before the 1st of June, 1831—and $3,500 for the engine which shall be adjudged the next best."

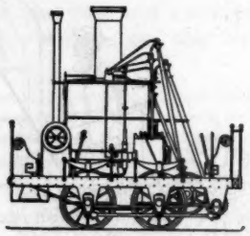

Fig. 8.

Three or four locomotives, amongst them one with a rotary engine, built by Mr. Childs, of Philadelphia, entered into the competition during the summer of 1831. The only one of them, named the "York," which proved equal to the moderate performance required of them, was the one built by Messrs. Davis & Gartner, two machinists of York, Pa. The engines had a vertical boiler and vertical

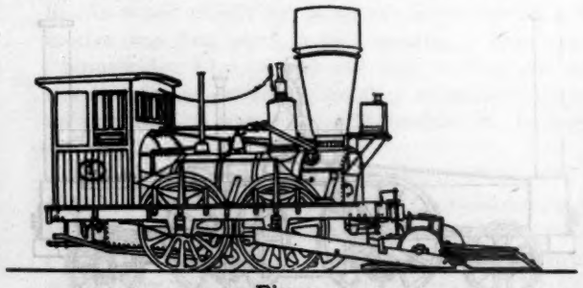

Fig. 9.

cylinders, with four coupled wheels 30 inches in diameter. It was altered considerably after being placed on the road. The "Atlantic" was afterwards built by the same firm, and was the first of what were afterwards known as the grasshopper engines (Fig. 8), which were used for many years on the Baltimore and Ohio Railroad.

In August, 1831, the locomotive "John Bull" (Fig. 9), built by George & Robert Stephenson & Co., of Newcastle-upon-Tyne, was received in Philadelphia for the Camden and Amboy Railroad and Transportation Company. This is the old engine which was exhibited at the Centennial Exhibition in Philadelphia in 1876. In the winter of 1831 or 1832, three locomotives built by the same firm in England were received and were put to work on the Newcastle and Frenchtown Railroad in Delaware.

The third edition of "Wood's Treatise on Railways," published in 1838, contains a tabular statement which gives the names and dimensions of engines built by R. Stephenson & Co., Newcastle-upon-Tyne, and the names of the railways for which they were built. This table contains the names of the following locomotives for American roads:

"Delaware," for Newcastle and Frenchtown Railroad.
"Maryland," " " " " "
"Pennsylvania," " " " "
"No. 42," for Saratoga and Schenectady Railroad.
"H." and "Mohawk," for Mohawk and Hudson Railroad.
"Stevens," for New York.
"No. 52," for United States.
"Edgefield," for Charleston and Columbia Railroad.
"Brother Jonathan," for Mohawk and Hudson Railroad.
"No. 61." " " " " "
"No. 75," for Saratoga and Schenectady Railroad.
"Wm. Aiken," for Charleston and Columbia Railroad.
"No. 99," " " " " "
"No. 104," for Pennsylvania Railroad.
"No. 105," " "
"No. 106," " Columbia "

No dates are given in the table, but all of these sixteen

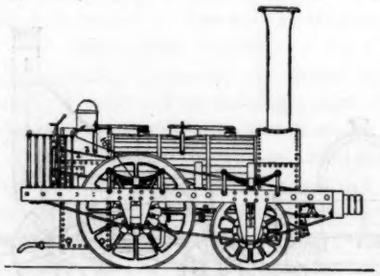

Fig. 10.

engines must have been built before 1838. Most of them were probably of what was known as the "Planet" class (shown by Fig. 10), which is the form of engine that succeeded the "Rocket," and the only one which the Stephenson's built for some years after its adoption. These locomotives, which were imported from England, doubtless, to a very considerable extent, furnished the types and patterns from which the engines which were afterwards built here were fashioned. But American designs very soon began to depart from their British prototypes, and a process of adaptation to the existing conditions of the railroads in this country followed, which afterwards "differentiated" the American locomotives more and more from those built in Great Britain. Until recently, a marked feature of difference between American and English locomotives has been the use of the truck under the

former. Its use was proposed by Mr. Horatio Allen, in a report dated May 16th, 1831, which he made to the South Carolina Canal and Railroad Company, of which he was then the chief engineer. The locomotive with two trucks (shown by Fig. 6) was built from his design in the latter part of 1831, and was put into operation on the South Carolina Railroad in the early part of 1832. In the latter part of the year 1831, the late John B. Jervis invented what he called "a new plan of frame, with a bearing carriage, for a locomotive engine, for the use of the Mohawk and Hudson Railroad (represented by Fig. 11), which was constructed and put on the road in the season of 1832."

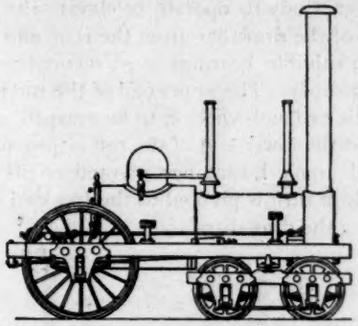

Fig. 11.

A truck was also devised by Ross Winans and applied to a locomotive on the Baltimore and Susquehanna Railroad (now the Northern Central) in the latter part of 1832 In a letter published in the AMERICAN RAILROAD JOURNAL of July 27th, 1833, Mr. Jervis describes the objects aimed at in the use of the truck, as follows:

"The leading objects I had in view, in the general arrangement of the plan of the engine, did not contemplate any improvement in the power over those heretofore constructed by Stephenson & Co.;* but to make an engine that would be better adapted to railroads of less strength than are common in England; that would travel with more ease to itself and to the rail on curved roads; that would be less affected by inequalities of the rail than is attained by the arrangement in the most approved engines."

The effectiveness of the truck in accomplishing what it was intended for was at once recognized, and its almost general adoption on American locomotives followed.

In the year 1833, Judge Dickerson, then president of the Paterson and Hudson River Railroad, ordered a locomotive, which was called the "McNeill," from George Stephenson, which was to be as good as possible, without regard to cost. It arrived and was put in operation in the year 1834. The cylinders were 9 inches diameter by 18 inches stroke, and the engine had one pair of driving-wheels five feet in diameter, which were behind the fire-box. The axle was cranked, and the cranks were close to the wheels; there was room for the connecting rods to pass by the outside of the furnace. The front end was supported by a four-wheeled truck; the fire-box and tubes were of copper. The engine continued in use many years, and was said to be very fast, and was finally sold to a western railroad, the business of the Paterson and Hudson River Railroad having grown beyond the engine's capacity.

There may have been other English engines, of which there is no record, imported into this country about this time, but, as already stated, there is no doubt that to a verp considerable extent the English engines were the models from which American designers received many suggestions; but, as will be shown, they very soon began to depart from the original types, and the development of the locomotive here was quite distinct from that which it had in Europe.

(To be continued.)

* The truck was applied by Mr. Jervis to an engine built by Stephenson & Co., of England.

Where Eight Hours Might be a Day's Work.

MR. EDWARD ATKINSON shows, in a late number of *Bradstreet's*, that in each 1,000 workers in the United States, only 100 are engaged in occupations upon whom an eight-hour law could be enforced, and that consequently the passage of such a law would simply operate to depress the trades upon which it could be enforced, relatively to all other trades. In the first place, agricultural labor, cattle and sheep growing, horticulture and fishing could not be subjected to an eight-hour law, and, if they could, it would ruin them. Blast furnaces, gas works, bakeries, restaurants and all other employments requiring continuous heat could not be subjected to the eight-hour rule without instant destruction. Paper mills require continuous operation. So also do railroads. There then are the great multitude of employments that the officers of the law can never reach, or know anything about, the people who work at home, such as seamstresses, washerwomen, carpenters, blacksmiths—in short, everybody who is his own employer. The only trades that could be reached are those where large numbers of workers are collected together for the purpose of attending machinery, such as cotton and woolen mills, rolling-mills, boot and shoe factories, and the like. These number not more than one in ten of the people of the United States who work with their hands. As to these Mr. Atkinson says, with his usual penetration: "If the advocates of an eight-hour law should get it passed, the first efforts of the same men who had promoted it would be to find out how to work overtime to the best advantage in order to gain a better subsistence. The logical results of all such acts by which the free conduct of adults is restricted in certain specific cases is to limit the full use and benefit of labor-saving machinery, and thus to lengthen the necessary hours of work of the great mass of the people.

The Production of Iron in Great Britain.

THE total make of pig iron in Great Britain, in 1885, was 7,250,657 tons, against 7,528,966 tons in 1884, a decrease of 278,309 tons, or about 3½ per cent. The decrease compared with 1883 is 14½ per cent. The decrease last year was general with the exception of Nottinghamshire and Leicestershire, they increasing by 88,987 tons. The total stock of iron in 1885 was 2,362,169 tons, an increase of 542,702 tons; these figures are, however, only estimates. The total production of Bessemer steel ingots in 1885 was 1,247,001 tons, a decrease of 52,675 tons, or about 4 per cent. as compared with 1884. The only district showing an increase was South Wales, from 387,728 tons to 403,114 tons. Only 671,583 tons of steel rails were made in 1885, against 784,968 tons in 1884; in 1882 the production reached 1,235,785 tons.

New Inventions.

Mowry's Car-Coupling.

JACOB C. MOWRY, of Rising Sun, Ohio, is the inventor of a new and improved form of car-coupling, which is herewith illustrated and described. This invention relates to an improved car-coupling; and it consists of the novel construction and arrangement and peculiar combination of parts, substantially as hereinafter fully set forth, and explained.

In the accompanying cuts, Fig. 1 is a perspective view of a car-coupling embodying the invention. Fig. 2 is a vertical central sectional view through the device. Fig. 3 is a bottom plan view.

A designates the draw-head, which is secured to the car-body in the ordinary well-known manner, and provided with the link-chamber A′, which is of the ordinary class. The draw-head is provided with a longitudinal slot B, that opens into the chamber A′, and terminates a short distance from the front thereof, to provide a solid front or cap C, to the draw-head; and the draw-head is further provided near its rear end with integral abutting flanges *c*, that bear against the car-body, and in the lower wall of its chamber with a short longitudinal slot *c*′.

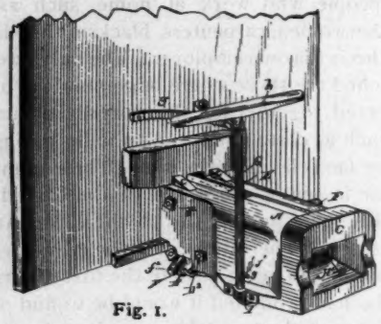

Fig. 1.

MOWRY'S CAR-COUPLING.

D designates a coupling bar or hook, which is arranged in the slot B, and is free to move longitudinally therein for a limited distance. The upper edges of the draw-bar lie flush with or a little below the upper edges of the slot in the draw-head, and at its front edge it is provided with a depending hook *d*, which is preferably curved or inclined, so as to permit a coupling-link of an approaching draw-head to enter. The rear end of the draw-bar or hook has a transversely-arranged longitudinal slot *d*′, through which passes a pivot or bolt d^2, that is also passed through and detachably secured in the draw-head, and the draw-bar is elevated by an oscillating arm or lug D′, that is journaled on a pin D^2, and depends from and projects through the slot *c*′, of the draw-head, so as to be acted on by the devices for elevating the hook-shaped end of the draw-bar to release the coupling-link. The free hook-shaped end of the draw-bar is normally depressed and arranged in the path of an approaching coupling-link by means of a spring E, one end of which bears on the coupling-bar, and the other end is secured to a transverse pin or bolt *e*, that passes through the draw-head, to detachably secure or connect the spring thereto.

The coupling-hook or draw-bar D, can be elevated from the side of the car without requiring the brakeman to pass between the cars, by means of a horizontal rock-shaft F, that is journaled in suitable bearings *f f*′, and carries an arm or leg f^2, at its inner end, that is adapted to impinge against the arm D, that elevates the draw-bar when the rock-shaft is turned by manipulating the handle or crank f^3, at the outer end thereof, the journal or bearing *f*′, being secured to the draw-head to support the inner end of the shaft, and the bearing *f*, secured to and depending from the car-body at the outer side thereof to support the outer end of the shaft.

G designates a vertical rod which extends to the top or roof of the car-body to operate or elevate the free hook-shaped end of the draw-bar from the roof, and this rod is journaled in suitable bearings *g g*′, secured to the draw-head and car-body. The upper end of the rod is provided with a handle or band-wheel *h*, to be grasped and turned by hand, and the lower end of the rod is provided with a right-angled crank I, that has pivoted to its free end a link *i*, which in turn is pivoted to the free end of the arm D′, to elevate the draw-bar.

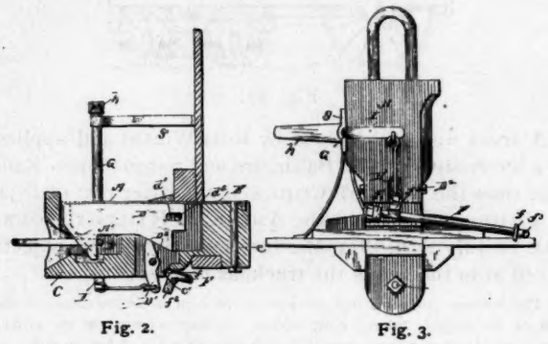

Fig. 2. Fig. 3.

MOWRY'S CAR-COUPLING.

This being the construction of the device the operation thereof is as follows: When the coupling-link of an approaching car enters the draw-head and strikes the inclined or curved edge of the draw-bar hook *d*, the latter is elevated against the tension of the pressure-spring and is forced rearwardly for a limited distance, thus permitting the link to pass beneath the hook and engage the hook *d*, thus automatically coupling the cars. The impact of the coupling-link on the draw-bar forces it rearwardly, as above mentioned, to reduce the shock on the parts of the draw-head, and when the cars are started or in motion the link draws the coupling-bar forward, and the front end thereof engages with the cap C, thus providing an increased bearing-surface therefor. To uncouple the cars, the rock-shaft or vertical rod G, is operated by hand from the side or roof of the car-body to elevate the upper end of the oscillating arm D′, and consequently the hook-shaped end of the coupling-bar, whereby the hook *d*, is drawn from engagement with the link, and the latter can then be easily withdrawn from the draw-head. It will thus be seen that an improved coupling is provided which will automatically couple the cars and can be operated to uncouple the cars from either the side or roof of the same, thus providing means which do not require the brakeman to endanger his life in passing between the cars to couple or uncouple them.

The rod G, has a projecting pin *j*, that bears against the draw head to limit the rotation thereof.

In lieu of supporting one end of the spring on a pin or bolt and having its opposite end bear on the draw-bar, the spring can be rigidly secured to and carried by the coupling-bar and bear on the draw-head or other device at its opposite end to normally depress the hook-shaped end of the draw-bar in the path of an approaching link.

It is claimed for this form of car-coupling that it is perfectly adapted to its purpose, and will couple on grades or curves, while its application is economical, and the construction simple and thoroughly durable.

The device is under the control of the inventor, to whom all inquiries and communications should be addressed.

Brewer's Horseshoe.

WILLIAM N. BREWER, of Cleveland, O., is the inventor of a new and improved form of horseshoe which is herewith illustrated and described. This invention relates to improvements in horseshoes in which removable calks having T-shaped heads are secured, respectively, between depending lugs, the latter having undercut inner faces to correspond with the calk-heads. The calk is held to its seat by a key interposed between the head of the calk and the body of the shoe, and each pair of lugs

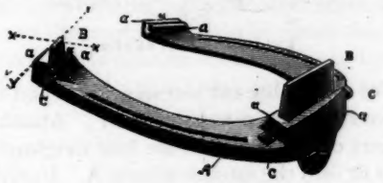

Fig. 1.

BREWER'S HORSE-SHOE.

have a connecting cross-bar at one end and internal shoulders at the other end, that engage the end of the calk-head when the latter is seated, to the end that the calk is held by the said cross-bar and shoulder from being displaced endwise, and the key, serving only as a blocking to hold the calk to its seat, does not cause extra strain on the parts.

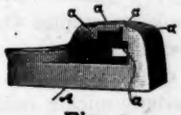

Fig. 2.

BREWER'S HORSE-SHOE.

In the accompanying cuts, Fig. 1 is a view in perspective of a horse-shoe embodying the invention, one of the heel-calks being removed. Fig. 2 is an enlarged view in perspective, showing one of the sockets of the heel-calks, looking from the outside of the shoe. Figs. 3 and 4 are enlarged elevations in section, respectively, on the lines *x x* and *y y*, Fig. 1.

A represents the body of the horseshoe, and B the detachable calk. The calks have T-shaped heads that are secured between lugs *a*, the latter being made integral with the body of the shoe and set in pairs, the lugs having undercut inner sides to correspond with and form seats for the head of the calk when the latter is separated slightly from the body of the shoe. The lugs for the heel-calks are set obliquely, the inner ends thereof extending farther rearward, as shown. Each pair of lugs *a*, is connected at one end by a cross-bar *a'*, the latter being separated from the body of the shoe to leave room for the passage of the point of the key C. The cross-bars are preferably respectively on the inner end of the lugs at the heel of the shoe. The toe-calk being set straight across the shoe, the cross-bar may be on either end of these lugs. The cross-bar forms an abutment for one end of the calk, the latter being entered from the opposite end of the lugs. At the open end the lugs have internal

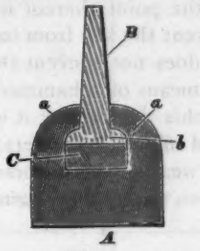

Fig. 3.

BREWER'S HORSE-SHOE.

shoulders a^2, that abut the ends of the calk-head when the latter are seated. In entering the calks the heads thereof are placed against the body of the shoe and the calk slid endwise between the lugs, the flanges of the heads passing under the projections that form the shoulders a^2. The calk having been cut of suitable length, when the latter abuts the cross-bar, the other end thereof will fit nicely inside the shoulder a^2, when the calk is brought to its seat. The key C, is inserted between the body of the shoe and the head of the calk, and holds the latter to its seat, and the cross-bar and shoulders of the lugs hold the calk from moving endwise. The key C, only serves as a blocking, and it is not necessary to drive the key with any considerable force, but, on the contrary, the key need only be crowded in tight enough to prevent it from rattling, and therefore does not strain the lugs or

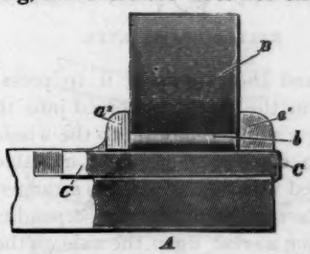

Fig. 4.

BREWER'S HORSE-SHOE.

the body of the shoe between the lugs. The removable calks of a horseshoe receive heavy and oft-repeated knocks against the paving-stones, and if the lugs are under heavy strain from keying the calks, they are likely to be broken or bent so as to loosen the calks. With this improved construction the lugs, as aforesaid, are not under any strain from keying, and therefore not liable to be broken. By the reason of the oblique line in which the heel-calks are set the tendency is to drive these calks inward and rearward; but the inner ends of the heel-calks, as aforesaid, abut the cross-bar *a'*, and are therefore held

securely from displacement in this direction. The aforesaid shoulders are ample to hold the calks firmly in the other direction. The toe-calk, being set straight across the shoe, is less liable to be driven endwise, but it is held in the same manner by the shoulders on one end and the cross-bar on the other. The shoe is preferably made of malleable cast-iron, or of steel casting, if preferred, and the calks are made of steel, the latter being rolled into bars of suitable size and shape in cross-section, from which bars the calks are cut into suitable lengths. The keys are rectangular in cross-section, and made slightly tapering lengthwise, and the key-seat on the body of the shoe is made to correspond with the tapered key. After the key is in place the point thereof is bent, riveted, or upset a trifle to prevent the key from backing out. Such fastening, however, does not prevent the key from being readily removed by means of a hammer and punch.

It is claimed for this device that it is simple, economical and durable, and efficiently answers the purpose of its invention, while in wear on both horse and shoe it is a great improvement on the ordinary form.

Kells's Car-Starter.

HERBERT KELLS, of Astoria, N. Y., is the inventor of a new and improved form of car-starter, the construction and operation of which is herewith illustrated and explained. The object of this invention is to utilize the weight of the car by means of a movable frame or platform placed under the car, in connection with pawls working in ratchet-teeth placed on the wheels of the car, so that by removing temporarily the weight of the car

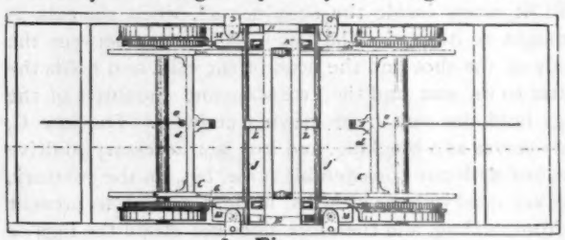

Fig. 1.

KELLS'S CAR-STARTER.

from the axle and then allowing it to press upon the movable platform the pawls are forced into the ratchet-teeth, imparting a starting motion to the whole car.

The invention consists in making a movable frame or platform provided with springs, and so arranged by means of guides as to be capable of moving perpendicularly, and is supported when at rest upon the axle of the wheels of the car. The platform or frame is so formed by means of inclined sides as to raise the springs attached thereto in a perpendicular direction. These springs have their lower bearing upon the platform or frame and their upper bearing upon the bottom of the car, and when the frame is moved in either direction the weight of the car is necessarily taken from the pedestal-springs and supported by the springs of the platform. Attached to the inner side of the car-wheels are placed ratchet-wheels of almost the same circumference as the wheels. Attached to each side of the frame or platform are weighted pawls adapted to act on the ratchet-wheels. Attached to the frame of the car is also provided a rock-shaft provided with stop arrangements, which is acted upon by a projection upon the sliding platform, so as to force the pawls into the ratchet of the car-wheels when the sliding platform is brought into operation. The sliding platform is brought in either direction by means of rods or chains attached to the ordinary brake-shaft of the car. When the brake-shaft is loosened again, the weight of the car pressing upon the springs of the platform forces the platform down and presses the pawls against the ratchet on the car-wheels, causing them to mesh into and work said ratchet and thus start the wheels in motion.

In the accompanying cut, Fig. 1 represents a plan view of the improved car-starter. Fig. 2 is a sectional view of the same through the dotted lines *x x*.

Upon the inner side of each car-wheel is securely fastened a ratchet-wheel A, of nearly the same circumference as the car-wheels. Resting upon the axles of the car-wheels is placed a sliding platform consisting of two slides B, having their inner portion made at a double incline, as shown in Fig. 2. These slides are connected together by cross-pieces C. Upon the middle of the frame so formed is placed a cradle D, made of an open rectangular frame having its side ends prolonged on each side, and in the

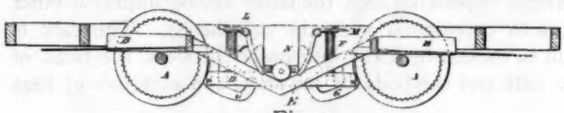

Fig. 2.

KELLS'S CAR-STARTER.

side ends of which are cut recesses E. Upon the cradle D, are placed spiral or other springs, F. Attached to the outer corners of the cradle D, are four weighted pawls G, adapted to fit into the ratchet-wheels A. Upon the sides of the car at the center are securely fastened the guides H, which fit into the recesses E, of the cradle D, causing the cradle to move perpendicularly up and down when in motion. On the cross-pieces C, at the points *d d'*, is a stop or lever I I'. Attached to the side timbers of the car are rock-shafts J J', provided with the levers L and M, and so placed in reference to the cradle that when said cradle is elevated to its highest point the lever or stop I, will engage with the lever L, and the lever M, will press upon the pawl G. Placed upon the cradle D, are the friction-pulleys N N'. Attached to the middle of the cross-pieces C, are hooks or staples O, to which may be secured rods or chains, and the other end of said rod or chain being suitably connected with a windlass or brake of the car, serves to communicate motion to the entire apparatus. The springs F, at their upper ends are suitably secured to the bottom of the car.

P represents the pedestal-frame upon which the weight of the car ordinarily rests.

The operation of the invention is as follows: The car being in motion, its weight, as before stated, rests upon the pedestal-springs, bringing the sliding frame forward by means of the chain attached to the staple or pulley O, causing the frame to slide forward. This motion of the sliding frame causes the cradle, with its attachments, to rise perpendicularly, the friction-pulleys N N', moving along the inclined sides of the frame nearest the back of the car, and the weight of the car is received upon the springs E, relieving the pedestal-springs of a portion of

the weight of the car. The lever I, of the frame engaging with the lever L, of the rock-shaft on the forward side of the car, presses the lever M, upon the pawls G, nearest to the back of the car, holding said pawls closely against the teeth of the ratchet-wheels A, on the hind wheels. The driver, when wishing to start the car again, then releases the brake and the weight of the car forces the cradle downward, carrying with it the sliding frame to its normal position, at the same time pressing the pawls G, against the teeth of the ratchet-wheel A, and thus imparting a starting momentum. When the brake is released and the platform slides backward, the pressure of the stop I, and the lever L, is removed, and the pressure of the lever M, on the pawl G, is also removed, allowing the weighted end of the pawl to act and leaving the ratchet-wheels free from all action of said wheel.

It is claimed for this device that it is simple, effective and economical, fully answering the required purpose. It has the further advantage of passing over large track obstructions, except where lying very close to the wheels.

Woodmansee's Car-seat.

CHARLES H. WOODMANSEE, of Norton, Kansas, is the inventor of a new and improved form of car-seat, which is herewith illustrated and described. The object of this invention is to provide a car-seat which may be readily reversed without interfering with other seats in the car, and relates to that particular form in which the back and seat are permanently connected and arranged to roll upon anti-friction rollers, so that these parts may be made to

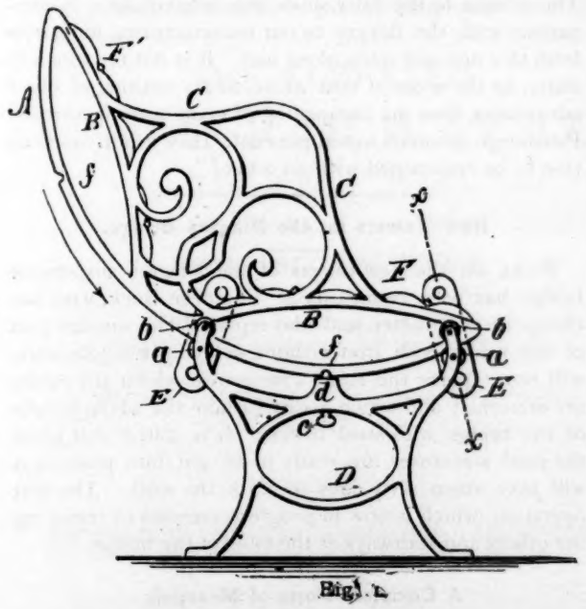

Fig. 1.

WOODMANSEE'S CAR-SEAT.

exchange functions when reversed, so that which is the back in one position becomes the seat in the other position, and *vice versa*.

In the accompanying cuts, Fig. 1 is a side elevation of the improved car-seat; Fig. 2 an enlarged detail sectional view taken on line *x x* in Fig. 1; and Fig. 3 is a detail view of the spring-acted stop for holding the car-seat in either of the positions in which it may be placed.

The end frames of the improved car-seat are formed of curved rails A, formed integrally with the curved bars B, and arm-rests C, in a single casting. The rail A, is formed on a circular curve, and is grooved longitudinally on opposite sides, and received between grooved rollers *a b*, supported by the end pieces D, of the seat-frame, or by one end piece D, and by the grooved rollers *a b*, secured to plates E, supported by the wall of the car. The curvature of the bars B, is similar to that of the rails A, but in the opposite direction, said curved bar B, forming, with

Fig. 2.

WOODMANSEE'S CAR-SEAT.

the end portions of the rails A, ellipsoidal loops of about the same shape as the cross-sections of the cushions F F', which are supported by the loops. The cushions act interchangeably as seat and back of the car-seat, and the arm-rests C, connect the bars B, and are strengthened and supported by scroll-work formed between the bars B, and the arms. The ends of the frames are symmetrical in form, so that they present the same appearance in both positions. A spring-acted bolt *c*, passes through a socket *d*, in the upper cross-bar of the frame D, and projects into one or the other of the notches *f*, formed in the rail A,

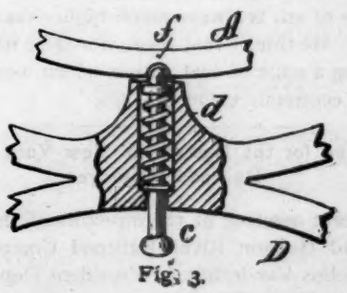

Fig. 3.

WOODMANSEE'S CAR-SEAT.

securely holding the seat in either of the positions in which it may be placed.

When it is desired to reverse the seat, the bolt *c*, is withdrawn from the notch *f*, in the rail A, when the back of the seat may be pushed down in a circular path, as indicated by the arrow, bringing the cushion F', into the position before occupied by the cushion F, so that it serves as the back of the seat.

In the construction shown and described it will be seen

that two cushions F, and F', which form, respectively, the back or seat, are sustained at their ends by the loop-shaped frames composed of bars A, and B, at some distance from each other, which leaves a small open space between said cushions that prevents the lodgment and accumulation of dirt or trash. This middle portion of the frame A, which would otherwise be weak, is strongly braced by the arm-pieces C C.

It is claimed for this form of car-seat that while simple, it is throughly applicable to the purpose, and much more graceful and handsome than the ordinary form in use, and, though economical in construction, is durable and readily handled by train-men.

Both Driving Rods of an Engine Broken.

As a freight train was flying around a sharp curve near Martinsville, Ill., on June 25, at a high rate of speed, one of the driving rods of the engine, a huge ten-wheeler, broke, and instantly was revolving at a terrific rate, knocking the cab to splinters, and battering the boiler out of shape. As the train flew by the station the other rod broke and the tender jumped the track. The two rods were revolving at "lightning speed," dealing terrific blows on the cab and boiler, and the steam was escaping in clouds from the holes knocked in the boiler, while the tender was bounding along on the ties. As soon as the up grade was reached, on the other side of the station, the speed began to slacken and the train stopped, with the engine in the centre of the long bridge over the north fork of the Embarrass River. The tender jumped back upon the rails just before the bridge was reached, or a terrible wreck would probably have resulted. The engineer and firemen escaped from the cab when the first rod broke, and were not injured.

Selling Coal by Assay.

MR. C. H. ASHBURNER has proposed to the American Institute of Mining Engineers that coals should be sold by assay, just as minerals are now disposed of. He showed from average samples of anthracite coal that the percentage of ash is always much higher than is generally supposed. He thinks that there would be no difficulty in establishing a scale of fuel ratios, which would represent the actual economic value of coals.

Building for the Use of the New York Central Railroad Employes.

AT a recent meeting of the directors of the New York Central and Hudson River Railroad Company, a letter from Cornelius Vanderbilt to President Depew was read, in which Mr. Vanderbilt said:

"I have had plans prepared for a building 80 feet front by 40 feet in depth, to be used for the benefit of railroad men in the service of the companies centering at the Grand Central Depot. It will be a substantial structure, with bath-rooms, gymnasium and bowling alleys in the basement; reading rooms, library, room for games, and offices on the first floor; a large hall for general meetings and rooms for classes on the second floor; and rooms for janitor's family, and sleeping-rooms for men coming in late, or detained in the city over night, in the upper story. I wish you to lay before the Board of Directors this proposition: If the company will set apart the land at the corner of Madison avenue and Forty-fifth street (40 feet on the street by 80 feet on the avenue) for the use and purposes for which such a building would be erected, I will bear all the expense of construction and of fitting and furnishing it ready for use."

The directors authorized President Depew to accept Mr. Vanderbilt's offer and thank him. The plot of land in question was used for storing cars before the Grand Central Depot was extended.

Shall Natural Gas be Taxed?

A CORRESPONDENT of the New York *Evening Post*, in a letter to that paper, says: "In this time of discussing taxation and protecting industries, there is one commodity that seems to be a natural subject of special taxation—natural gas. The scope and promise of this new factor in industry is such as portends no little disturbance to our iron and other industries, and there seems no good reason why the nation should not share in the benefit of this great boon, although its discovery and source be in a special district of the country.

"Natural gas, as its name indicates, is not a product of skill, is not even a surface product such as is conveyed in government titles to land. It comes from "the bowels of the earth," and one who regards its present vast influence and conjectures its future, must concede that it will throw our industries out of balance. If ever there was a suitable and equitable subject for special taxation, is not here one? The menace to the dairy sinks into insignificance in comparison with the danger to our manufacturing industries from this new and miraculous fuel. It is not too much to claim, on the score of cost alone, to say nothing of other advantages, that the cheapening of many manufactures in Pittsburgh amounts to ten per cent. How is fair competition to be maintained without a tax?"

New Towers for the Niagara Bridge.

WORK on the new towers of the Niagara suspension bridge has been commenced. Engineer Buck, who has charge of the matter, and who replaced the wooden part of the bridge with iron without delaying a single train, will now replace the stone towers over which the cables are stretched and which really sustain the whole weight of the bridge, with steel towers. It is stated that when the steel structures are ready to be put into position it will take about sixty days to finish the work. The first operation, which is now in progress, consists in removing the offices and stairways at the ends of the bridge.

A Complete Form of Monopoly.

THE creed of the Knights of Labor, as far as it has been authoritatively announced and practically illustrated, seems to embrace three distinct propositions, to wit: (1) That none but members of the order shall be given employment; (2) that a member of the order shall not be discharged from work without the order's consent; and (3) that all persons so employed shall be at liberty to quit whenever they choose, and shall quit whether they want to or not when directed to do so by the officers of the

order. It would be interesting to have some able and perspicuous oratorical Knight explain wherein such a creed as this differs from the most complete form of monopoly. The explanation should also include some information as to how labor is going to be made free and happy by being compelled to forego all right of personal judgment in order to secure a chance to earn a living.—*St. Louis Globe-Democrat.*

A Big Verdict.

THE Pennsylvania Supreme Court has a case before it where a first-class ticket was bought in 1883 from Erie to Cleveland and return. On the passenger's return he got on a limited express-train, which a railway employé told him was the next train for Erie. The conductor would neither accept his ticket nor the money tendered for his fare, and put him off late at night between stations. In walking the half mile to Cleveland he was knocked down and seriously injured in some way unknown. The jury gave a verdict for $48,750, which the court refused to reduce, and the case went up to the Supreme Court on a writ of error.

A Dwelling Wrecked at Midnight by a Runaway Freight-Car.

A CAR of an inward bound freight train from Lowell, attached to engine No. 59, on the Boston & Lowell Railroad, became detached between Short and East streets, East Cambridge, about one o'clock in the morning of July 16th. It ran a short way, then leaped the track and dashed into a two-story wooden house and completely demolished it. In its course it shattered the walls of the chamber in which Jeremiah Callahan and his wife were sleeping. Callahan received a severe blow in the side by a falling beam, his wife escaping unhurt. The children, who were sleeping in an apartment on an upper floor, escaped with a thorough shaking up. The wall of the south end has been twisted from the main structure, and now stands out in the shape of a crescent, being held at the top and bottom by the framework of the dwelling.

On the track side the whole interior of the house was laid open.

Railways in Congress.

TO properly estimate the present railway activity, it is well to consider the number of bills before Congress affecting that interest. In the list of bills just passed by the House no less than 24 bridges are included, of which eight are to cross the Missouri river and four the Mississippi river. The crossings of the Missouri river are to be made at St. Joseph, Council Bluffs, Saline City, in Clay or Jackson counties, and above St. Charles, all in Missouri, and near Atchison, Kan., near Chamberlain and at Pierre, Dak. The points at which the Mississippi is to be crossed are near Alton, Ill., near Keithsburg, Ill., at Winona, Minn., and at Red Wing, Minn. Other rivers which are to be spanned are the Detroit, the Tennessee, the Illinois, the St. Croix, the Kansas, the Yellowstone, the Tombigbee, the Warrior, etc.

A THOROUGH test of iron ties by the Pennsylvania Railroad Company has resulted in the company refusing to adopt them.

GENERAL OFFICES **THE ROTE AUTOMATIC BRAKE COMPANY,**

MANSFIELD, OHIO, *November 3d, 1884.*

To the Westinghouse Air Brake Company, Pittsburgh, Pa.:

GENTLEMEN:—Understanding from your published announcements that you recommend your brake for freight-train use we respectfully invite you to a complete and searching public test of its merits in competition with the *Rote Automatic Brake* This test to be made in so complete and critical a manner as to show all the railroads of the country, as well as the Railroad Commissioners of the various States, which of the two brakes is the one which should be used; for the test will, we are certain, leave no doubt in the minds of any witnessing it.

To insure the proper management of the test we suggest that you choose one person, we another, and these two a third person, all three to be well known as capable and honorable rolling-stock experts, to conduct the test, their expenses to be jointly borne by you and by us.

An invitation to witness the test to be extended to the General Officers of Railroads and all State Railroad Commissioners to the members of the National Car-Builders Association, and to the Railroad and daily press.

The test to be at such time and place as may be mutually agreed upon, but we suggest that the proper place would be on some road having high grades and sharp curves, so that both brakes may have as hard and complete a test as possible. As it is necessary to make the test searching and complete, and as all railroads wish to increase the length of their trains and only wait for a brake which will enable them to do so, we think each train should be made up of 50, 60 or 70 cars, as you may prefer, or, if you think best, of even more cars.

Your company to supply your train and engines, we to supply ours.

The following points, among others, to be considered and reported upon:

Cost of equipping trains.

Simplicity.

Freedom from breakage.

Certainty of action.

Effectiveness.

Cost of maintaining.

"Flatting" of wheels.

Any other points submitted by you or by us in writing to be added to the above.

The brakes or trains are to be tested in every manner and under all conditions which practical railway service may suggest, including yard as well as line service.

Among others the following tests are to be applied to both trains:

1st.—Each train is to be (part of the time) run by engineers and crews who have never operated either brake and who are wholly unfamiliar with them.

2d.—The trains are (part of the time) to be partly made up (as nearly all freights are everywhere) of foreign cars, which have neither your nor our brake on, so that the cars having your break or ours on shall be widely and irregularly separated from each other.

3d.—The locomotives drawing your train and ours to be exchanged, from time to time, and draw each others trains.

4th.—Two locomotives equipped as so many freight engines and tenders are, with hand-brakes instead of steam or air brakes, are to be substituted for the two engines used in the test part of the time. Any brake which will not work properly if this is done, you will admit, can be of little practical value in actual service.

5th.—From time to time each train is to be stopped and foreign cars (not equipped with either your brake or ours) are to be run into it, at irregular intervals, just as actual service requires constantly.

6th.—In the making up of trains, etc., crews are to be exchanged at random, so that the test may fully illustrate the convenience of operating each kind of brake in actual ordinary service.

7th.—Frequent short runs, stops and quick starts are to be made.

8th.—A series of yard tests are to be made, showing the action, convenience, etc., of the two brakes.

We mention a few necessary tests only, and you and we, as well as the test committee, are to add any number of others, it being distinctly understood that if you decline any test proposed by us, or we decline any proposed by you, it shall be condered an explicit and positive admission of inferiority.

This rule must in every case be strictly observed, namely: *Both brakes must be tested in precisely the same manner,* so that there may not only be absolute fairness, but no room for suspicion even of anything else.

You have been in the brake field a long time, have profited justly and largely from the patronage of railroads, and we are sure will welcome this plan for allowing your patrons and the American public to judge for themselves which brake should come into universal use.

Having proper confidence in the merits of your brake we know you will gladly and promptly accept our proposition herein made, as you must feel that the test will be complete.

The railroad public is a very fair-minded, capable body, and will most thoroughly appreciate and fully recognize the equity and fairness of our offer to you, and, in common with business-like people everywhere, will naturally (and, we are sure you will admit, properly) consider it a virtual confession of inferiority and a public admission that the Westinghouse Brake is inferior to the Rote Brake and that it is unfitted for general freight service, should you decline or neglect to avail yourselves of the proposition we make you herein.

Permit us to add in closing that we wish to express to you our desire to have this communication received in the spirit in which it is sent, and to have it express to you our wish for a full, fair and searching test of the two articles in the relative merits of which the railroad interest is *primary* and that of the owners even secondary. Respectfully,

THE ROTE AUTOMATIC BRAKE COMPANY,

Per M. D. HARTER, President.